Two Oaks Quarry: Environmental Setting and Site Design

Prepared for Mansfield Sand Ltd

CONFIDENTIAL

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Quality Control Sheet

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Client	Mansfield Sand Ltd
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Authors

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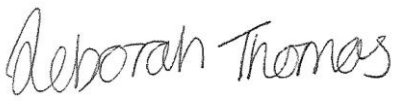
Checked by	Deborah Thomas (Principal Hydrogeologist) Chris Woodhouse (Principal Hydrogeologist)	
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Revision History

Revision	Details	Prepared by	Checked by	Approved by	Issue Date
REV01	Draft for RSK comment	JFR	DT/CDW	CDW	05/03/2024
REV02	Final report	JFR	DT/CDW	CDW	25/02/2024

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1 INTRODUCTION

1.1 Background and Scope

Mansfield Sand Company Ltd (Mansfield Sand) has planning permission (ref. 4/2010/0178) to extract silica sand and gravel (referred to as silica sand) in four phases and restore to original ground levels for agricultural and nature conservation purposes at Two Oaks Quarry (the Site) near Mansfield, Nottinghamshire. Mansfield Sand has submitted a Planning Application (ref: LT/2023/128154/01-L01) to the Nottinghamshire County Council to carry out the backfilling and Site restoration under the terms of a Deposit for Recovery Environmental Permit. The application for the Environmental Permit is being made by Envireau Water on behalf of Mansfield Sand.

Mansfield Sand is applying to the Environment Agency for an Environmental Permit to deposit imported inert and suitable non-hazardous waste materials at the Site under a deposit for recovery activity, in order to restore the Site. The Environmental Permit application is for a bespoke deposit for recovery activity.

This Environmental Setting and Site Design (ESSD) report has been prepared by Envireau Water to satisfy the requirements of Question 1, Appendix 2 of Part B4 of the Environmental Permit application forms.

The purpose of this report is to describe the regulated facility in relation to the environmental setting, identifying the source terms, pathways and receptors that are used as the basis for the supporting risk assessments, including:

- Environmental Risk Assessment (ERA) – this report assesses risk to the environment and human health from emissions and accidents that may be associated with the proposed recovery operations (Envireau Water, 2024a);
- Hydrogeological Risk Assessment (HRA) – this report quantitatively assesses risks from the proposed infilling operation on the hydrogeological environment (Envireau Water, 2024b);
- Site Monitoring Plan – this report sets out the proposed monitoring scheme for the Site (Envireau Water, 2024c); and
- Stability Risk Assessment (SRA) – this report qualitatively assesses stability risks from the proposed infilling operation (Envireau Water, 2024d).

This ESSD sets out the pollution control measures that will be incorporated into the Site design to minimise risks to the environment.

1.2 Operator and Agent

Envireau Water (with support from RSK Geosciences) is acting as the Agent on behalf of the Applicant and Operator, Mansfield Sand. Envireau Water submitted a Waste Recovery Plan (WRP) to the Environment Agency in June 2023 (Mansfield Sand Company Limited, 2023). This included a deposit versus recovery assessment.

The Environment Agency agreed in September 2023 that the proposed activity is classified as a deposit for recovery operation. The application reference is EPR/LB3709UV/A001 and correspondence with the Environment Agency is presented in Appendix A.

1.3 Proposed Activity

The Site was awarded planning permission by Nottinghamshire County Council on 7 March 2013 (ref. 4/2010/0178) (See Appendix B) for the following activities:

> *The extraction and processing of silica sand and gravel, including the provision of a new site access road, landscaping and screening bunds, sand and soil processing plants and other associated Infrastructure, restoration to agriculture and nature conservation, quarry offices, quarry processing plant, sand drying, sand bagging plant and quarry lagoons.*

Figure 1 shows the Site location and surrounding area. The planning permission grants Mansfield Sand the right to extract the silica sand in a phased approach, with the next stage of mineral extraction not permitted to start until the preceding phase is complete. The planning permission gives Mansfield Sand 50 years to work the mineral from the date of first mineral extraction.

Mansfield Sand has permission to extract mineral and restore the Site in four main phases within the Site Boundary (Figure 2); works began in 2015 at Phase 1, which was divided in 11 units/lagoons. Mineral is excavated dry, water is managed around various on-site lagoons, and no water is discharged off-site.

Mansfield Sand proposes to restore Lagoons 7, 8, 9 and 10 within Phase 1 (Waste Recovery Boundary in Figure 2) to no more than original ground levels by using Site-derived soils/soil forming materials (1,474,362 tonnes silt and 11,600 tonnes of sand) and imported inert and suitable (chemically inert) non-hazardous restoration materials. Mansfield Sand estimates that up to 296,000 tonnes of imported material will be needed to complete the Site restoration requirements.

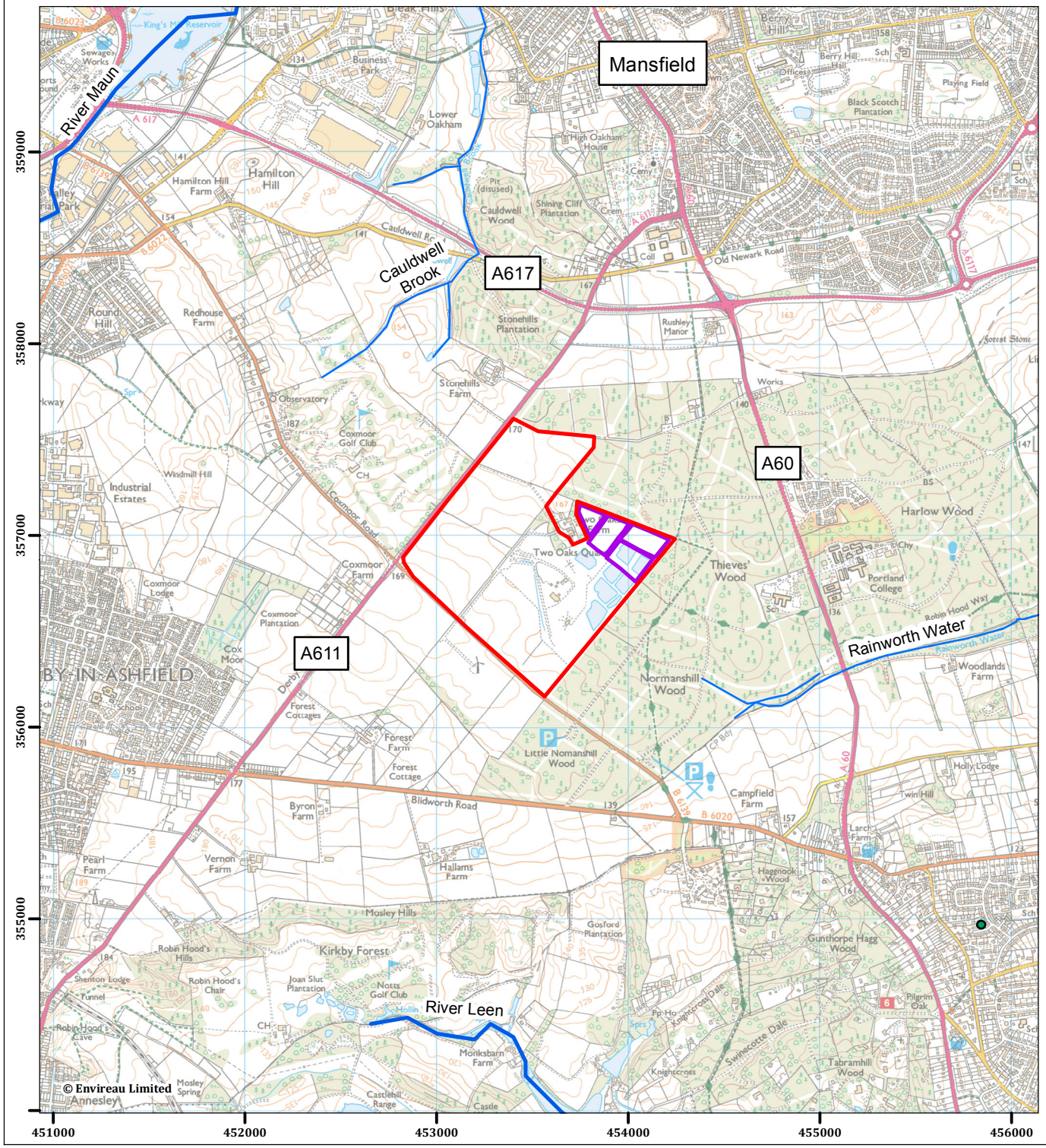
1.4 Data Sources

The information in this report is predominantly based on secondary data analysis associated with the Site and the surrounding land area. The main sources of data are summarised below:

- Proposed development plans provided by Mansfield Sand;
- Geological data from mineral exploration boreholes and monitoring wells provided by Mansfield Sand;
- Previous reports for the Site prepared in support of the planning, abstraction licence and discharge activity permit applications;
- British Geological Survey (BGS) mapping;
- Ordnance Survey mapping;
- Site visits undertaken by Envireau Water;
- Data on designated sites from Natural England; and
- Data from the Environment Agency including water quality, rainfall, historical landfill data, LiDAR data, flood mapping, abstraction licences and discharge activity permits.

Figure 1: Site Location and Setting

Mansfield, Nottinghamshire



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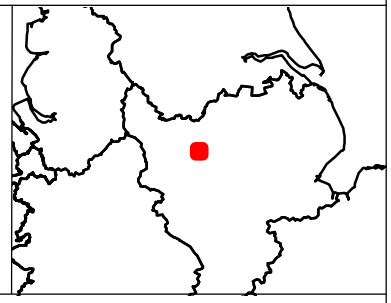

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12 March 2024

NGR: 453,536 E / 356,874 N

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Drawn by:	JH
Ref:	FIG Site Location and Setting

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Figure 2: Proposed Development

Mansfield, Nottinghamshire

Site Boundary

Waste Recovery Boundary

Phasing

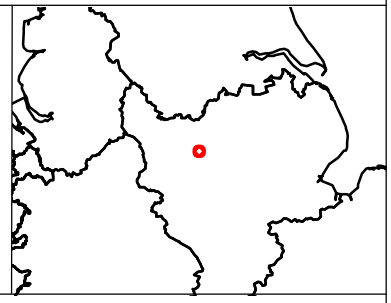
Phase 1

Phase 2

Phase 3

Phase 4

Notes:



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Client:	Mansfield Sand Company Ltd
Drawn by:	JH
Ref:	FIG Proposed Development

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2 SITE DETAILS

2.1 Site Setting

The Site is located approximately 2.5 km south of Mansfield and 1.2 km east of Kirkby in Ashfield, at NGR SK 453699 356842 (approximate Site centre), in Nottinghamshire. The Site is currently an active silica sand quarry (Figure 1).

Normanshill Wood and Thieves Wood bound the Site to the east, with public footpaths, bridleways and car parks located within the surrounding woodland. Approximately 210 m north of the Site is Stonehills Farm and agricultural land, with Stonehills Plantation located north of the farm and 230 m north of the Site. To the northwest is the Coxmoor Golf Club.

The surrounding land uses are summarised in Table 1.

Table 1 Surrounding Land Uses

Direction	Surrounding Land Use
Northeast	The Site is bound to the northeast by the northern section of Thieves Wood. There are public right of way and buildings within Thieves Wood. The A617 is 730 m north of the Site and runs west to east. The A60 is 590 m east of the Site and runs north to south.
Southeast	The Site is immediately bound to the southeast by Normanshill Wood. Within the woodland there are public footpaths, bridleways, and car parks. Portland College is located 770 m east of the Site. The source of Rainworth Water is in the woodland, 550 m southeast of the Site. Approximately 2 km southeast of the Site is Ravenshead village.
Southwest	To the southwest, the Site is immediately bound by Coxmoor Road and agricultural land. Forest Farm and Forest Cottages are located 730 m south of the Site. There is a single wind turbine on agricultural land 120 m south of the Site. Kirkby in Ashfield is located ~1.2 km west of the Site and ~900 m southwest is Blidworth Road that connects Kirkby in Ashfield to Ravenshead.
Northwest	The Site is immediately bound to the northwest by the A611, which runs northeast to southwest. Coxmoor Golf Club is located next to the A611. The northern section of the northwest of the Site is bound by agricultural land associated with Stonehills Farm.

The natural topography of the Site slopes broadly south-eastwards. The highest ground is in the northern and western corners of the Site, which are at around 170 m AOD, and the elevation drops to ~145 m AOD on the south-eastern Site boundary.

Surrounding the Site, the highest ground lies to the north and west of the Site, rising to an elevation of 195 m AOD. The elevation drops towards the east, with a series of small valleys forming near Kirkby Road and Rainworth Water (550 m east of the Site).

2.2 Proposed Permit Boundary

The proposed Environmental Permit application boundary (the Site), and the Lagoons 7, 8, 9 and 10 of Phase 1 (the Waste Recovery Boundary) are shown on both Figure 1 and Figure 2.

The proposal is to restore lagoons 7, 8, 9 and 10 of Phase 1 within the Waste Recovery Boundary, created by excavation of the silica sand deposit by:

1. Infilling with silt from the Site to an elevation of around 146.5 m AOD; and
2. infilling imported inert and chemically inert non-hazardous waste to a height of 150 m AOD.

It is proposed that a quarter of the imported restoration materials will be suitable non-hazardous waste and three quarters will be capped with inert waste of soils, sub soils and sand. Further detail is provided in Section 3.5, and the development plans presented in the Waste Recovery Plan (Mansfield Sand Company Limited, 2023) are attached in Appendix C.

The infilling will take place within the Waste Recovery Boundary. The Site will be secure from public access by lockable gates at the Site Entrance/Exit, which is located on the southwestern side of the Site on Coxmoor Road.

3 SOURCE TERM CHARACTERISATION

3.1 Historical Developments

Based on historical OS mapping, the Waste Recovery Boundary was largely undeveloped agricultural land prior to mineral extraction commencing in 2015.

Of note in the wider area was the development and working of the Kirby Colliery ~3.5km west of the Site. This colliery was sunk in 1888-1890 and closed in 1968 with two shafts targeting seams over 300 m below ground.

3.2 Historical Landfills

The Site has never been subject to historical mineral extraction or landfilling prior to Mansfield Sand working the land in 2015. The Environment Agency records one historical landfill located within 2 km of the centre of the Site and five within 3 km.

Details of these historical landfill sites are shown in Table 2, based on information from the Environment Agency. The closest historical landfill is Sutton Tip, located 1.8km northwest of the Site. The locations of the landfill sites are shown on Figure 3 .

Table 2 Historical Landfill Sites

Fig Ref.	Site Name	Operator/Licence Holder	Active Dates	Waste Type	Distance from Site
HL1	Sutton Tip	County Construction services	31/12/1980 – 31/12/1984	Inert	1.2 km northwest
HL2	Midland Land Reclamation	-	-	-	1.5 km northwest
HL3	Sutton Quarry / Midland Land	-	31/12/1990 -	Inert, Commercial, Household	1.6 km northwest
HL4	Land at Junction of Diamond Avenue	C Millard and Company Limited	31/12/1970 – 31/12/1983	Inert	1.5 km southwest
HL5	Disused Sand Quarry	Stamford Waste Disposal Limited	31/03/1980 – 28/11/1983	Inert	1.7 km northwest
HL6	Vernon Farm	S G Crooks and Sons	18/10/1991 – 30/09/1994	Inert	1.8 km southwest

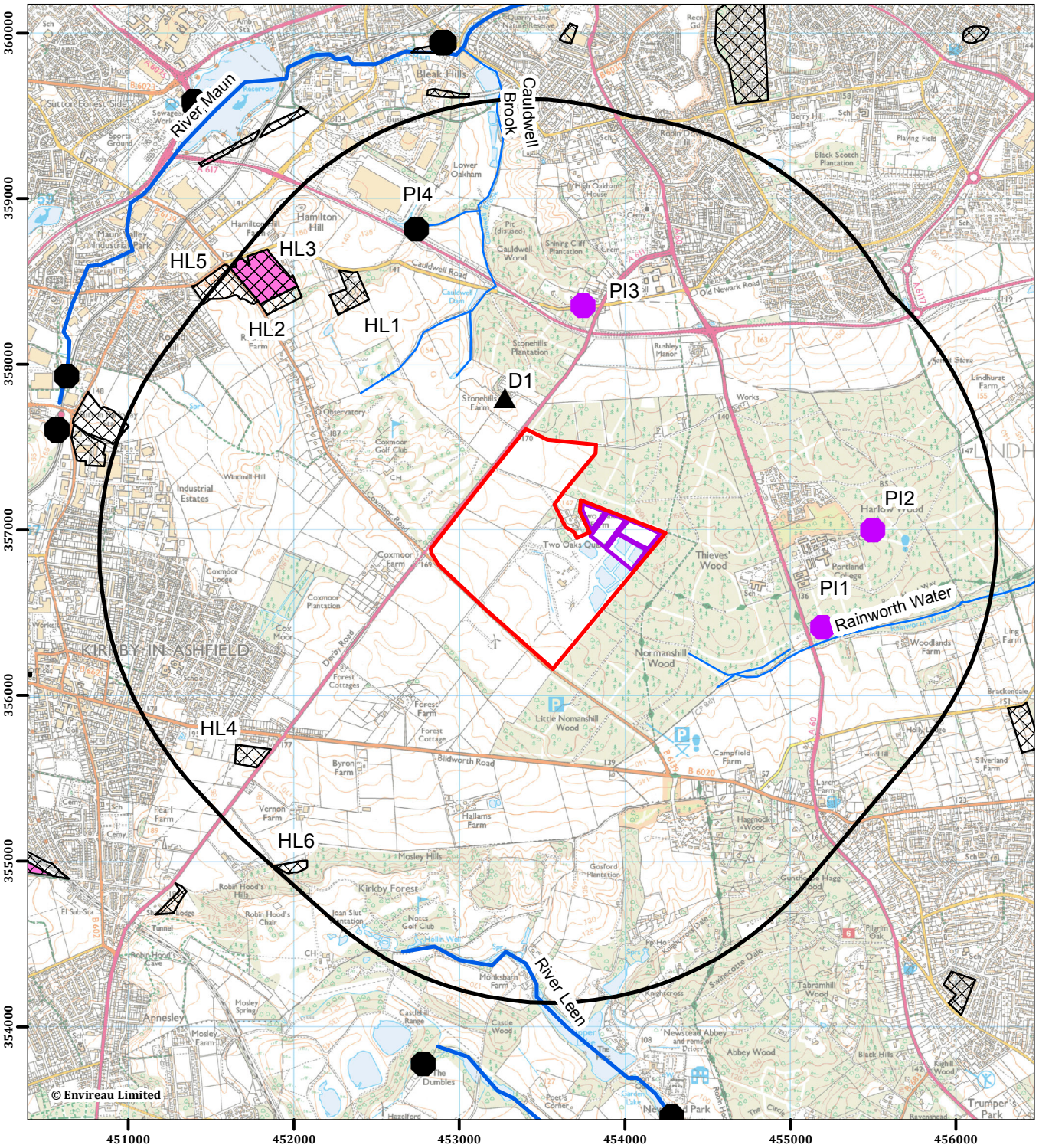


Figure 3: Environmental Setting

Mansfield, Nottinghamshire

- Site Boundary
- Waste Recovery Boundary
- 2km Search Radius
- Environment Agency Active Discharge Consents

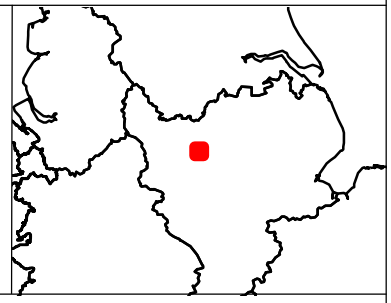
Environment Agency Landfill

- Historic Landfill Sites
- Authorised Landfill Sites

Environment Agency Historical

- Category 3 (Minor)
- Category 2 (Significant)

Notes:



0 375 750 1,125 1,500 Meters

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NGR: 453,433 E / 356,807 N

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Drawn by:	JH
Ref:	FIG Environmental Setting

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3.3 Operational Landfills

The closest authorised operational landfill is located 1.5 km northwest of the Site. The details of the landfill are shown in Table 3, and its location on Figure 3.

Table 3 Operational Landfill Sites

Site Name	Operator/Licence Holder	Licence ref.	Date of first input	Waste Type	Distance from Site
Sutton Quarry/ Midland Land	Midland Land Reclamation Limited	EAHLD22144	31/12/1990	Inert, commercial, and household	1.6 km northwest

3.4 Historical Pollution Incidents

There are one Category 2 (Significant) and three Category 3 (Minor) water pollution incidences recorded within 2 km of the Site. The details of the historical pollution incidences are shown in Table 4, with locations on Figure 3.

Table 4 Historical Pollution Incidences

Ref	Category	Cause	Distance and direction from Site	Date	Watercourse	Pollutant Source	Other Impacts
PI1	3	Control System Failure	1.1 km east	20/03/2002	Not Specified	Sewage Material	None
PI2	3	Monitoring System Failure	1.3 km east	16/11/2001	Not specified	Crude Sewage	None
PI3	3	Septic Tank or Sewage Treatment Plant Failure	1.7 km north	09/12/2009	Not specified	Crude Sewage	None
PI4	2	Not identified	2.4 km northwest	01/05/2008	Tributary to Cauldwell Brook	Inert Materials and Waste /Soils and Clay	None

The Category 2 incident occurred over 15 years ago in the tributary to Cauldwell Brook, which flows northwards, away from the Site. The other three incidents relate to sewage system failures.

3.5 Proposed Development

3.5.1 Overview

A description of proposed activities at the Site are provided in Section 1.3, this section focusses on the restoration and recovery element as proposed in Planning Application (ref: LT/2023/128154/01-L01).

The Site will continue to be operated by suitably qualified staff in accordance with an appropriate Environmental Management System (EMS). Mansfield Sand staff who will be managing the Site restoration have been assessed to be technical competent for inert and non-hazardous waste management operations under the CIWM WAMITAB Operator Competency Scheme and the Site manager is accredited to Level 4 (Medium Risk Operator Competence).

3.5.2 Restoration material requirements

Lagoons 7, 8, 9 and 10 (the Waste Recovery Boundary) will be restored to 150 m AOD. This restoration will consist of infilling of silt produced from the processing of the extracted silica sand at the Site, up to an elevation of 147.5 m AOD. The remaining 2.5 m will be infilled with inert waste (75%) and suitable non-hazardous waste (25%) imported from the local area.

The suitable non-hazardous waste material will be chemically inert and will be deposited in a layer no more than 0.5 m thick and capped by inert restoration material to an elevation of 150 m AOD. The top layer of each restored lagoon will consist of inert top soil from the Site over a blinding layer of sand.

An estimated 1.189 million tonnes of silt will be provided by the operations on-site to restore the phases to 147.5 m AOD. A further estimated 0.296 million tonnes of restoration materials (based on a mean density of 1.45 tonnes/m^3) will be imported and used to cap the silt material and to bring the restoration areas to a level of 150 m AOD.

The 1:4 ratio of non-hazardous to inert imported materials means that this is the equivalent of 74,000 tonnes of chemically inert non-hazardous restoration material and 222,000 tonnes of inert restoration material.

All restoration material to be used in the Site restoration will be consistent with that set out in the Waste Recovery Plan (Mansfield Sand Company Limited, 2023). Two layers of imported material are proposed:

1. Top layer of restoration material, composed by inert materials for general fill of the restored lagoons, as detailed in Table 5; and
2. Basal layer of restoration material, composed by chemically inert non-hazardous and non-contaminated waste, deposited in a layer of up to 0.5 m and capped by the top layer, as detailed in Table 6.

Only selected construction and demolition wastes will be accepted, and this type of waste must include low contents of other types of materials (e.g., metals, plastics, organics, wood, rubber etc.). The origin of all construction and demolition waste will be known and will not include waste from buildings treated, covered, or painted with materials containing dangerous substances nor waste from buildings polluted with inorganic dangerous substances.

Table 5 Proposed Waste Types for General Fill of the top layer of restoration material

European Waste Code	Description
01	WASTES RESULTING FROM EXPLORATION MINING, QUARRYING AND PHYSICAL ANDCHEMICAL TREATMENT OF MINERALS
01 04	Wastes from physical and chemical processing of non-metalliferous minerals
01 04 08	Waste gravel and crushed rocks other than those containing dangerous substances
01 04 09	Waste sand and clays
17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)
17 01	Concrete, bricks, tiles, and ceramics
17 01 01	Concrete
17 01 02	Bricks
17 01 03	Tiles and ceramics
17 01 07	Mixtures of concrete, bricks, tiles and ceramics[2]
17 05	Soils Stones and Dredging Soil
17 05 04	Soil and Stones
19	WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTEWATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE
19 12	Wastes from the mechanical treatment of waste
19 12 09	Minerals (excluding residual fines)[3]
20	MUNICIPAL WASTE (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS
20 02	Garden and Park Wastes
20 02 02	Soil and Stones

[1] Restricted to waste overburden and interburden only

[2] Metal from reinforced concrete must have been removed

[3] Restricted to wastes from treatment of waste aggregates that are otherwise naturally occurring mineral. Does not include fines from treatment of non-hazardous waste or gypsum from recovered plasterboards.

Table 6 Proposed Waste Types for the basal layer of restoration material

European Waste Code	Description
01	WASTES RESULTING FROM EXPLORATION MINING, QUARRYING AND PHYSICAL ANDCHEMICAL TREATMENT OF MINERALS
01 04	Wastes from physical and chemical processing of non-metalliferous minerals
01 04 08	Waste gravel and crushed rocks other than those containing dangerous substances

European Waste Code	Description
01 04 09	Waste sand and clays
17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)
17 01	Concrete, bricks, tiles, and ceramics
17 01 01	Concrete
17 01 02	Bricks
17 01 03	Tiles and ceramics
17 01 07	Mixtures of concrete, bricks, tiles and ceramics[2]
17 05	Soils Stones and Dredging Soil
17 05 04	Other stones and soils
[1] Restricted to waste overburden and interburden only [2] Metal from reinforced concrete must have been removed	

Documentation will accompany all waste material accepted, which will be reviewed in accordance with the Site's waste pre-acceptance and acceptance procedures to ensure any materials used are suitable for use in the restoration operations.

A description of the material acceptance procedures for the restoration of the Site, including basic characterisation and on-site verification is provided in the Waste Acceptance Procedures document that accompanies the application (RSK Geosciences, 2024a). These procedures will ensure that only materials that are both chemically and physically suitable for use in the recovery activity will be accepted at the Site.

3.5.3 Final Landform and After Use

The restoration plan (Appendix D) shows the proposed restoration scheme. The Waste Recovery Boundary is to be restored to pre-quarrying ground levels and topographic landforms. The land will be restored to heathland, with a small wetland on the area currently occupied by the Clean Water Lagoon, and Lagoons 4, 5 and 6. Gentle gradients towards the wetland area and to the south – southeast will be formed to ensure water drainage.

3.6 Site Engineering

There is no specific guidance/legislation for deposit for recovery activities. Although not applicable, to ensure adherence to best practice, the engineering of the Site has been designed with reference to guidance/legislation relating to the landfilling of inert materials (Environment Agency, 2024).

A side attenuation layer will be constructed using selected imported cohesive restoration materials. The suitability of this material has been assessed in the accompanying HRA (Envireau Water, 2024b).

3.7 Leachate Management and Monitoring

Leachate is generated by rainfall infiltrating through areas of open restoration materials. The restoration material to be used on Site is a mixture of inert and chemically inert non-hazardous material. Due to the inert nature of the materials identified in Table 5 and Table 6, there will be no leachate generated at the Site. Therefore, leachate management or monitoring is not needed.

3.8 Gas Management and Monitoring

A gas risk assessment has not been prepared for the Site, as Environment Agency guidance states that new inert landfills do not pose a landfill gas hazard (Environment Agency, 2024). The suitable non-hazardous materials identified within Table 6 are considered chemically inert as to pose no landfill gas hazard. Accordingly, management and monitoring infrastructure is not required and will not be installed.

3.9 Site Water Management

Dewatering occurs below the water table to allow the mineral to be excavated dry. The dewatering effluent is managed on site with no discharge occurring off-site under Transfer Licence MD/028/0070/012. This allows the abstraction of groundwater from each phase within the Site and its discharge to the Silt Lagoon System (Silt Lagoons 1 and 2), where suspended solids are allowed to settle out of suspension prior to entering the Clean Water Lagoon, which is in continuity with groundwater of the Sherwood Sandstone Aquifer.

The Site operates an Aquifer Recharge and Recovery (ARR) scheme to obtain water for mineral washing and dust suppression requirements. The ARR Scheme operates by abstracting water from two boreholes constructed into the Lower Magnesian Limestone Aquifer within the Cadeby Formation (Points A and B on Figure 4) and transferring it into the Sherwood Sandstone Aquifer via a dedicated borehole and the unlined Clean Water Lagoon (Points C and E on Figure 4) under abstraction licence 3/28/70/0096/1/RO2. The water stored in the Sherwood Sandstone Aquifer is then re-abstracted from a dedicated borehole, and from the unlined Clean Water Lagoon (Points D and E on Figure 4) under associated licence 3/28/70/0097/1/RO2 for mineral washing. In addition, water is abstracted from the dedicated borehole (Point D) for dust suppression. The locations of the Limestone and Sandstone boreholes, and the unlined lagoon (referred to as the Clean Water Lagoon) are shown on Figure 4.

Water abstracted from the Sherwood Sandstone Aquifer is used for mineral washing at the washing plant, before being transferred to the two silt lagoons for settlement and returning to the Clean Water Lagoon. There is a 2.5% loss of water during production. A schematic showing the water use onsite is shown in Figure 5.

Surface water runoff from the Site drains into Silt Lagoon 1.

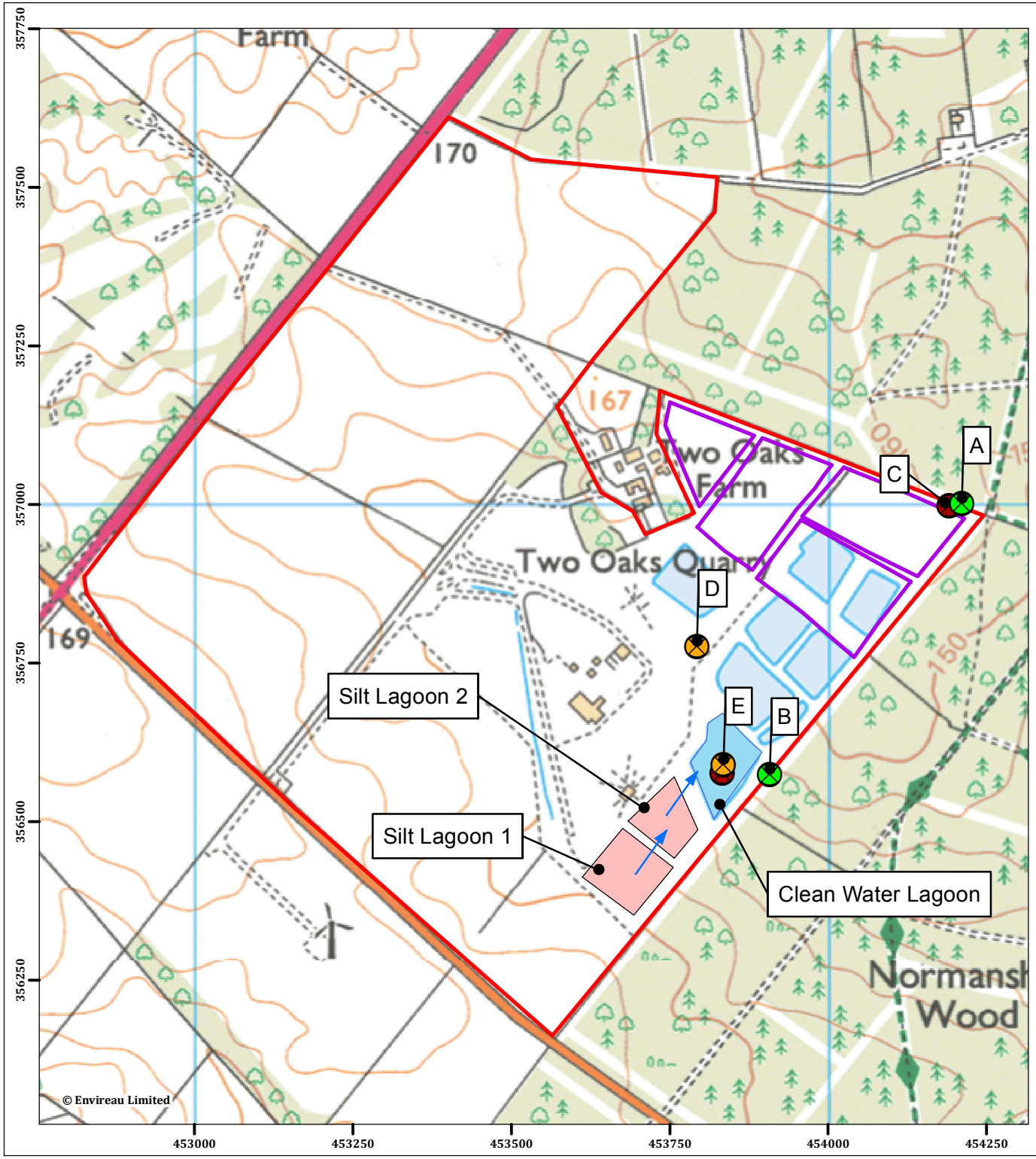

Figure 4: Site Water Management

Mansfield, Nottinghamshire

- Site Boundary
- Waste Recovery Boundary
- Clean Water Lagoon
- Silt Lagoon

Licence 03/28/70/0096/1/RO2

Points of abstraction from Lower Magnesian Limestone aquifer

- A
- B

Points of Recharge into Sherwood Sandstone

- E
- C

Licence 03/28/70/0097/1/RO2

Points of abstraction from Sherwood Sandstone

- D
- E

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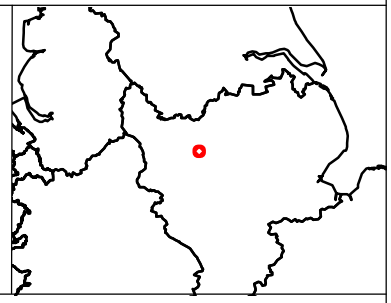

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12 March 2024

NGR: 453,536 E / 356,887 N

Project No.	3490476
Client:	Mansfield Sand Company Ltd
Drawn by:	JH
Ref:	FIG Site Water Management Plan

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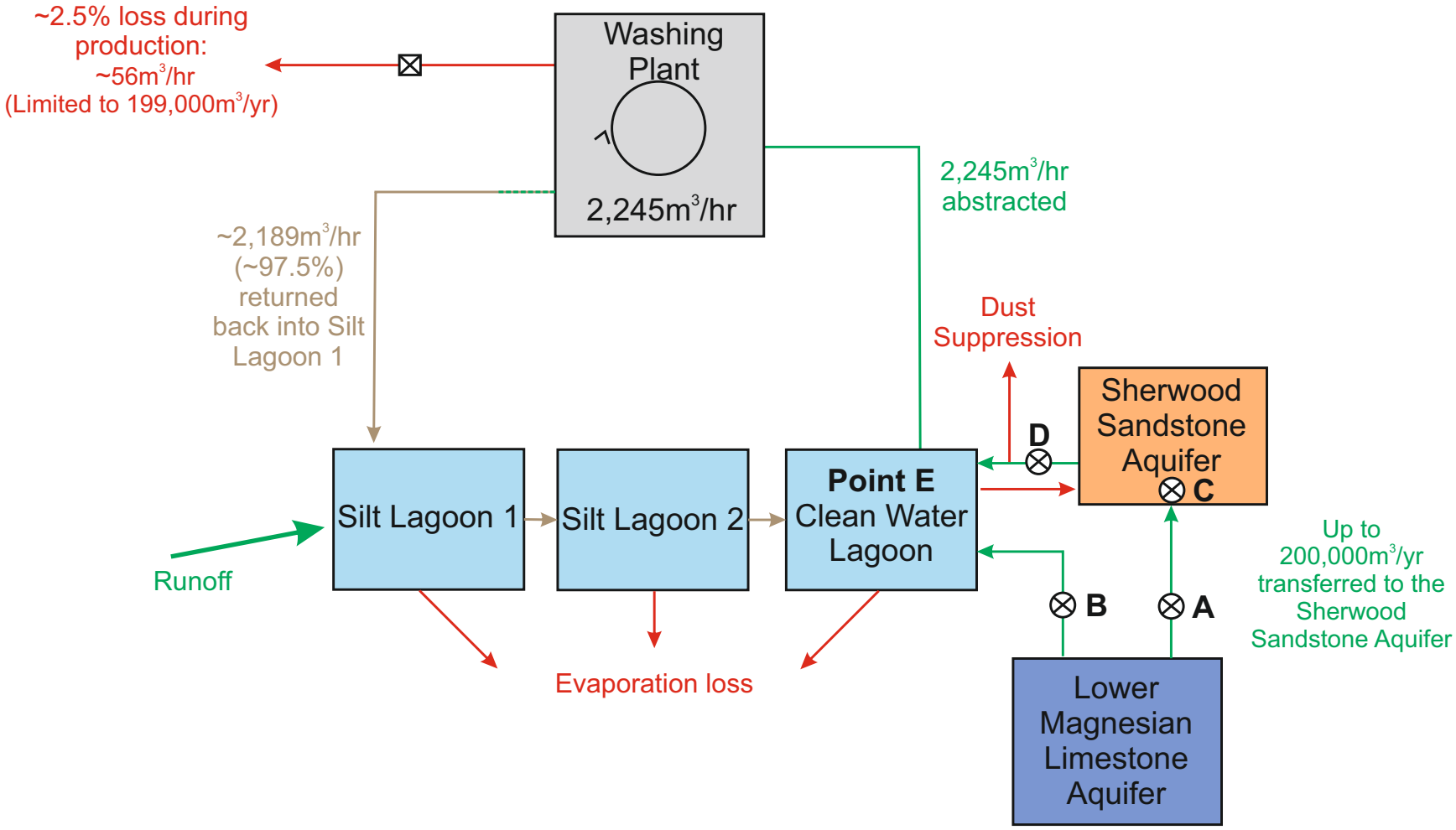

Figure 5: Water Process Diagram

⊗ Borehole

⊠ Calculated Volume

Water ingress to Sandstone Aquifer

Water losses

Water recirculation

Date: 01 March 2024
Project No. 3490476
Client: Mansfield Sand Company Ltd
Ref: FIG Water Process Diagram
Drawn by: JFR

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4 PATHWAY AND RECEPTOR CHARACTERISATION

4.1 Climate

The nearest Environment Agency rain gauge is at Newstead Abbey (ID 3775), located 2.6 km south of the Site. The long-term average annual rainfall between 2001 and 2022 is 758 mm, with a mean monthly rainfall of 61.3 mm. There is a typical seasonal variation, with the lowest monthly rainfall usually being in April (mean of 45 mm) and the highest monthly rainfall usually being in October (mean of 79.3 mm).

The Standard Annual Average Rainfall (SAAR) for the Site is 726 mm (HR Wallingford, 2024). This is 32 mm less, but consistent with, the long term average annual rainfall from the Newstead Abbey rain gauge.

4.2 Geology

4.2.1 Regional geology

Soils

The soils at the Site are freely draining slightly acid sandy soils (Cranfield Soil and Agrifood Institute, 2023).

Artificial Ground

BGS mapping has identified three areas of artificial ground within 2 km of the Site. Pockets of infilled ground are present predominantly around the more urban areas of Kirkby-in-Ashfield and Mansfield, while made ground is mapped approximately 2.2 km south of the Site, by the old Kirkby Colliery (see Figure 6).

Superficial Geology

There is minimal regional superficial cover. However, where present it is comprised of alluvium, head, glaciofluvial, and glacial till deposits. Within the Site, a narrow band of head is mapped running southeast to northwest across the centre of the Site with areas of glaciofluvial deposits in the northeast and southwest of the Site as shown on Figure 6.

The Head deposits consist of poorly sorted and poorly stratified, angular rock debris and/or clayey strata. The glaciofluvial deposits include mostly coarse-grained sediments (sand and gravel) with some finer-grained layers (clay and silt).

Bedrock Geology

The bedrock stratigraphy has been characterised based on BGS data (British Geological Survey, 2023) and exploration borehole records. The regional bedrock geology is shown on Figure 7.

The Site is underlain by the Triassic Chester Formation of the Sherwood Sandstone Group, which is the target of mineral extraction at the Site. The BGS describes the unit as comprising of medium to coarse grained, pebbly, cross-bedded sandstone. The Chester Formation has subordinate lenticular beds of reddish-brown mudstone or siltstone throughout.

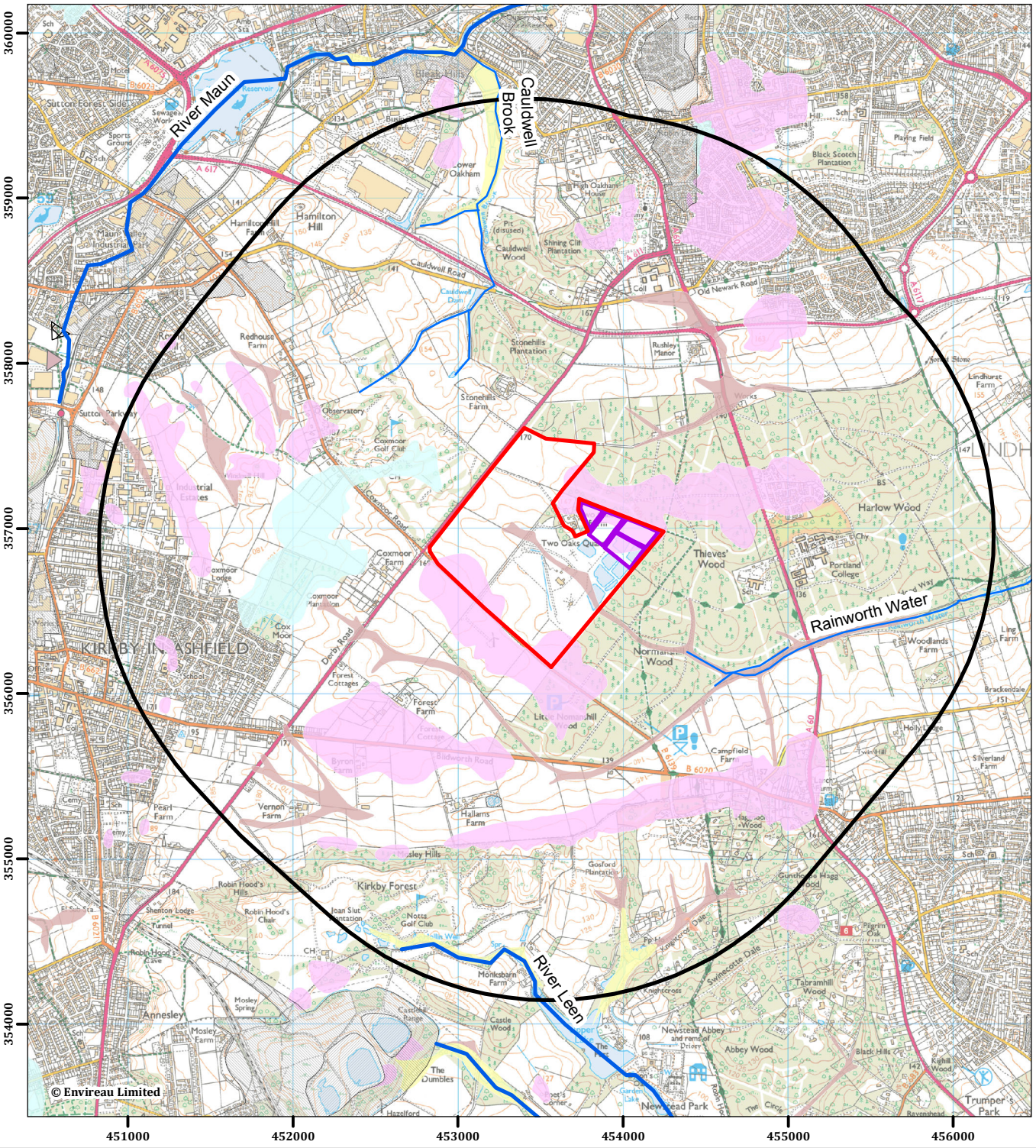


Figure 6: Regional Superficial Geology

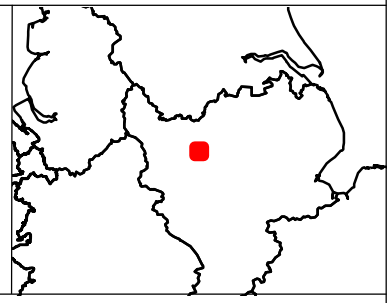
Mansfield, Nottinghamshire

- Site Boundary
- Waste Recovery Boundary
- 2km Search Radius

Superficial Geology

- Head Deposits
- Glaciofluvial Deposits
- Glacial Till
- Made Ground
- Infilled Ground

Notes:



0 375 750 1,125 1,500 Meters

Scale: 1:35,000 at A4

12 March 2024

NGR: 453,433 E / 356,807 N

Project No.	3490476
Client:	Mansfield Sand Company Ltd
Drawn by:	JH
Ref:	FIG Regional Superficial Geology

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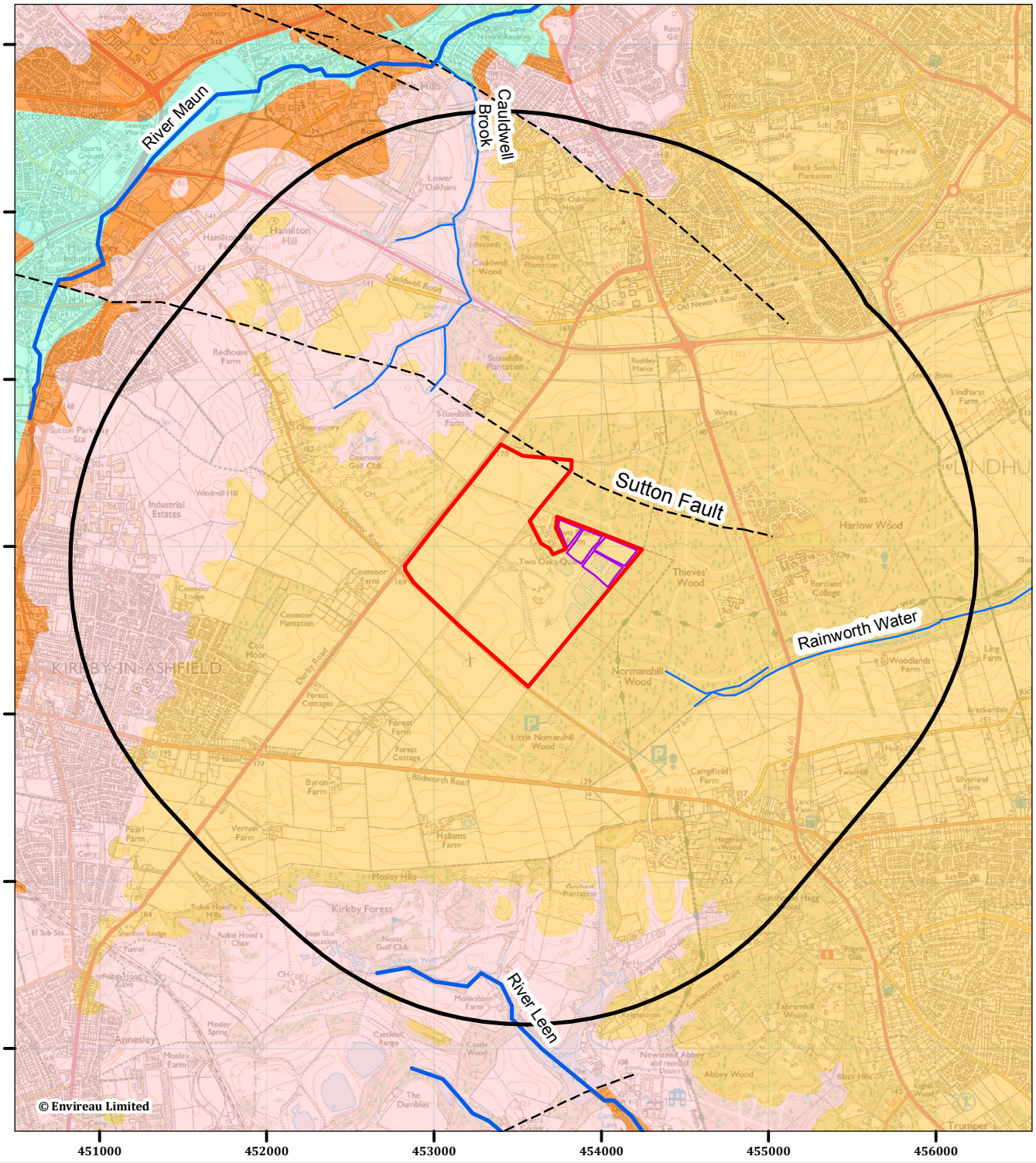


Figure 7: Regional Bedrock Geology

Mansfield, Nottinghamshire

- Site Boundary
- Waste Recovery Boundary
- 2km Search Radius

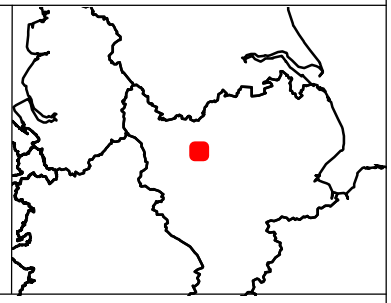
Linear Features

- Fault

Bedrock Geology

- Chester Formation - Sandstone
- Lenton Sandstone Formation
- Edlington Formation - Mudstone and Sandstone
- Cadeby Formation - Dolostone

Notes:



0 375 750 1,125 1,500 Meters

Scale: 1:35,000 at A4

12 March 2024

NGR: 453,536 E / 356,874 N

Project No.	3490476
Client:	Mansfield Sand Company Ltd
Drawn by:	JH
Ref:	FIG Regional Bedrock Geology

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Below the Chester Formation lies the Lenton Sandstone Formation (also part of the Sherwood Sandstone Group) which consists of very fine to medium grained sandstone containing subordinate beds of mudstone and conglomerate. Underlying the Lenton Sandstone Formation is the Cadeby Formation which consists of dolostone, commonly oolitic or granular, with subordinate mudstone, dolomitic siltstone, and sandstone. This is the unit where the Lower Magnesian Limestone Aquifer is located (see section 3.9). The Edlington Formation (formerly Middle Permian Marl) separates the Cadeby and Sherwood Sandstone Formation but is very thin around the Mansfield area.

Stratigraphic sequence

The regional stratigraphic sequence is presented in Table 7.

Table 7 Stratigraphic sequence

Age	Group	Formation	Description	Thickness (m)
Quaternary	Head			1 - 2
	Glaciofluvial			1 - 5
Triassic[1]	Sherwood Sandstone Group	Chester Formation	Comprises medium- to coarse-grained, pebbly, cross-bedded, friable sandstone	30+
		Lenton Sandstone Formation	Sandstone, very fine- to medium-grained. Argillaceous, cross-stratified; subordinate beds of mudstone and conglomerate.	20 - 35
Permian[1]	Zechstein Group	Edlington Formation	Mudstone with subordinate siltstone and sandstone	0 - 30
		Cadeby Formation	Dolostone, commonly oolitic or granular, with subordinate mudstone, dolomitic siltstone, and sandstone.	30 - 75
Carboniferous	Pennine Coal Measures Group	Pennine Upper Coal Measures Formation	Interbedded grey mudstone, siltstone, sandstone, and common coal seams	500+

[1] thickness taken from BGS borehole records.

The Permian bedrock unconformably overlies the Pennine Coal Measures Group at ~120 m below the Site. This deeper stratigraphical sequence has been devised from BGS borehole records available across the Site.

Structural Geology

The Sutton Fault is a major northwest / southeast trending fault, which crosses the very northern part of the Site but does not pass through the waste recovery area (see Figure 7), with the downthrow also located to the north (British Geological Survey, 2012). The regional dip of the Triassic strata is between 3° and 8° to the east, leading to stratigraphically older units outcropping to the west.

4.2.2 Local geology

Information on the geology in the vicinity of the Site has been obtained from exploration and monitoring well drilling at the Site, published geology maps, and publicly available borehole logs.

Overburden

A series of mineral exploration boreholes were drilled to determine the thickness and composition of the overburden and mineral thickness across the Site (Figure 8). The borehole logs show that the overburden is composed of topsoil, and glaciofluvial deposits, and varies from 0.1 to 5 m in thickness across the investigated area. Where the superficial deposits are composed of glaciofluvial deposits, to the north of Two Oak Farmhouse and along the northeastern boundary of the Site, the overburden is thicker (3 - 5 m) and described as topsoil underlain by medium-coarse sands and quartzite gravels, with clay recorded at P1 20-01. Where the superficial deposits are absent, the overburden consists of topsoil only (0.1 – 0.7 m thick).

Mineral

The target economic mineral is the silica sand of the Chester Formation. The exploration logs describe the deposit as fine to medium grained sand with occasional fine rounded quartz gravels. The mineral is thickest along the northeastern Site boundary, where it reaches a thickness of 25.8 m in the area of "Lagoon 9" (see Figure 2).

Table 8 summarises the thickness of the overburden and mineral at each of the exploration boreholes across the Site with the location of the exploration boreholes shown on Figure 8.

Table 8 Overburden and mineral thickness

BHID	Overburden Thickness (m)	Mineral Thickness (m)	BH Depth (m)
FBH20-01	5.0	19.10	30.0
FBH20-02W	0.6	23.4	33.0
FBH20-03	0.7	20.3	33.0
FBH20-04	3.0	24.0	30.0
FBH20-05	0.7	20.6	27.0
P1 20-01	3.9	25.8	32.5
P1 20-02	0.1	22.7	27.0

Underlying Bedrock

None of the exploration boreholes recorded the full thickness of the Sherwood Sandstone Formation; however, borehole A and B, drilled into the Cadeby Formation (British Geological Survey, 2023), show that Sherwood Sandstone has a thickness of approximately 56 m, while the Cadeby Formation has a thickness of at least 18 m.

4.3 Man-made Subsurface Pathways

The Kirkby Colliery targeted coal seams approximately 280 m below the base of the mineral extraction. Due to their depth and the intervening stratigraphy, they are not considered as preferential pathways.

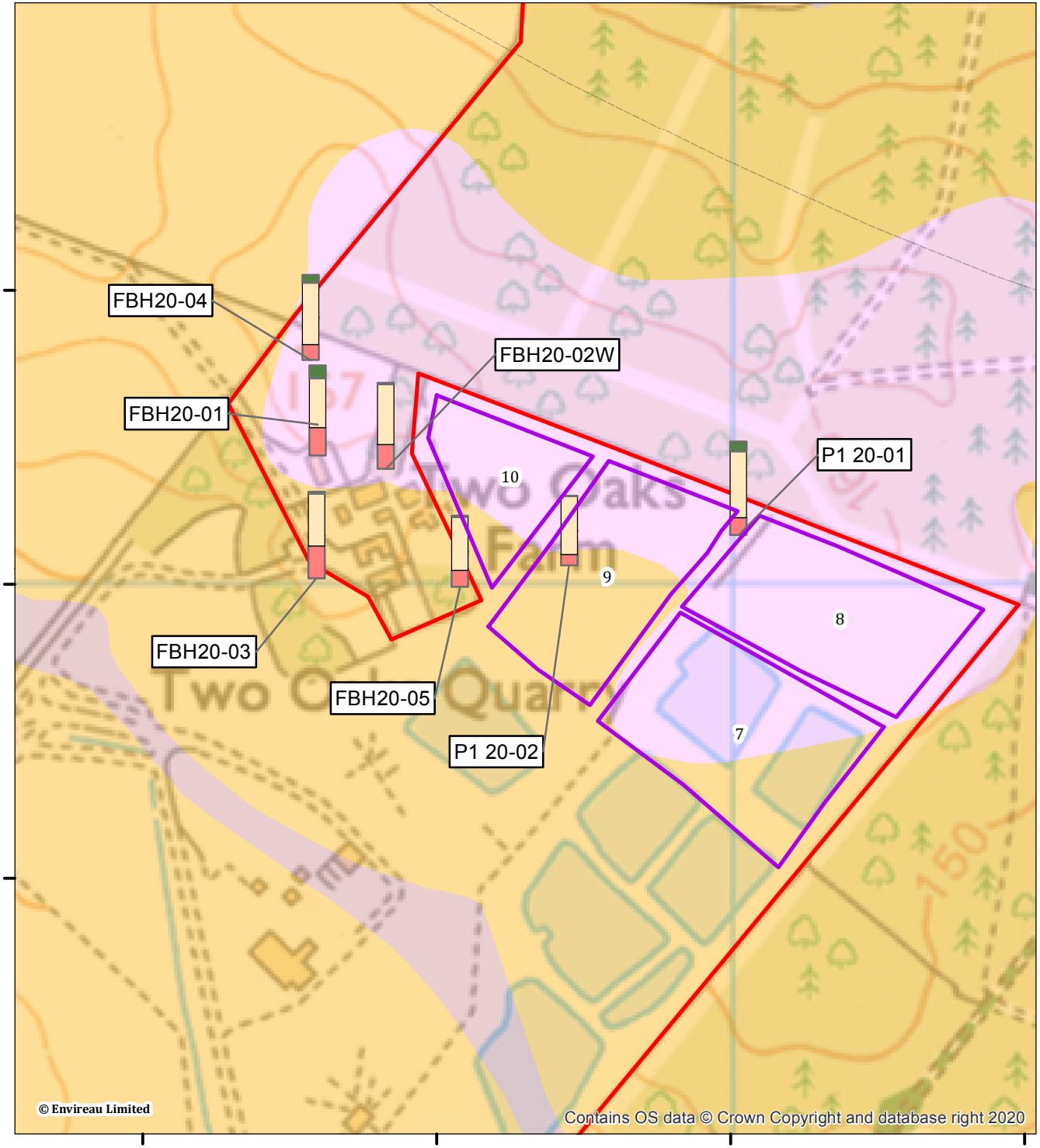


Figure 8: Exploration Boreholes

Mansfield, Nottinghamshire

- Site Boundary
- Waste Recovery Boundary

Exploration Boreholes

- Overburden
- Mineral
- Sandstone

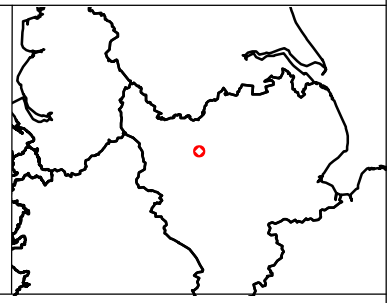
Superficial Geology

- Head Deposits
- Glaciofluvial Deposits

Bedrock Geology

- Chester Formation - Sandstone

Notes:



0 50 100 150 200 Meters

Scale: 1:5,000 at A4

12 March 2024

NGR: 453,826 E / 357,014 N

Project No.	3490476
Client:	Mansfield Sand Company Ltd
Drawn by:	JH
Ref:	FIG Exploration BHs

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4.4 Hydrology

4.4.1 Surface watercourses and waterbodies

The Site is located in the upper reaches of the Rainworth Water catchment (Figure 9) within the Idle River Catchment. The Rainworth Water flows in a north easterly direction away from the Site where it emerges 500 m east of the Site. The precise point of emergence varies seasonally dependent on groundwater levels. Approximately 20 km northeast of the Site, Rainworth Water confluences with the River Maun at Ollerton.

Approximately 4 km northeast of the Site, Rainworth Water enters Rainworth Lakes, a Site of Special Scientific Interest (SSSI) (Natural England, 2023) classified for being a base-poor marsh. Further details on the SSSI are provided in Section 4.6.7.

The River Maun at its closest, is located 2.5 km north of the Site. The River Maun flows in a north easterly direction and is impounded approximately 2.5 km from the Site, forming King's Mill Reservoir.

Approximately 1.7 km south of the Site is the River Leen, also a statutory Main River, which flows in a southerly direction. There are several lakes along its course, and two springs marked on the OS map which are the sources of tributaries of the River Leen, both at a distance of 1.7 km from the Site. Similarly, another spring is located 1.6 km to the northwest of the Site.

The Reedwater watercourse located 1.8 km to the south is impounded and a tributary of the River Leen. Directly downstream from this watercourse, the River Leen is impounded and forms the Upper Lake, which is located 1.9 km to the south of the Site.

There are a few smaller watercourses in the vicinity of the Site. To the northeast is Cauldwell Brook, which flows northwards to join the River Maun, and is ~530m from the Site at its closest point. There are several small ponds along the course of the Cauldwell Brook, the Mill Pond being the largest located approximately 2.1 km north of the Site.

The Silt Lagoon System within the Site is used for sediment settlement and groundwater transfer through the Clean Water Lagoon, which is in hydraulic continuity with the Sherwood Sandston Aquifer.

4.4.2 Fluvial flood risk

The Flood Map for Planning indicates that the Site is located in Flood Zone 1 (Environment Agency, 2023c) and is therefore at a very low risk of fluvial flooding (less than 0.1% in a year). The restoration will not alter fluvial flood risk as the Site will be returned to pre-development conditions with no watercourses being affected.

4.4.3 Surface water flood risk

An extract from the Environment Agency's surface water flood map is presented in Figure 10 (Environment Agency, 2023b). This mapping shows the flood risk prior to quarrying commencing.

The Site is shown to be at no risk from surface water flooding (Envireau Water, 2023). A topographic depression to the west of the Site, which drains into Rainworth Water, shows an area of higher risk (>3.3% in a year) where the

Clean Water Lagoon is located. During quarry operations, the haul road directs surface water runoff towards Silt Lagoon 1 and the Clean Water Lagoon. The restoration will return the Site to natural ground levels; however, the Clean Water Lagoon will remain in place and will receive surface water runoff from the Site. Runoff rates are not expected to increase following restoration as the land use is being returned to agricultural and heathland.

4.4.4 Surface water quality

Three surface water quality samples have been collected at Rainworth Water headwaters between May and December 2023. The water samples were analysed in a laboratory for major ions, metals, and hydrocarbons. The data have been compared to the UK Drinking Water Standards (DWS) and the relevant freshwater Environmental Quality Standards (EQS) to give an indication of water quality.

The laboratory results show that Rainworth Water is fresh, with an average electrical conductivity of 267 µS/cm, a neutral pH of 7.05, and moderately hard, with an average hardness of 109 mg/l as $CaCO_3$. However, there are elevated concentrations of dissolved copper, iron, manganese, and zinc, which exceed the EQS. Hydrocarbons also show an exceedance of the EQS however, this is due to the Limit of Detection (LOD) being higher than the EQS and none of the species were detected. This is also the case for cadmium, lead, and mercury. This data is presented in Appendix E.

4.4.5 WFD classification

The majority of the Site lies within the Rainworth Water from Source to Gallow Hole Dyke Water Body (ID: GB104028052940). In 2022, it was classified under the Water Framework Directive (WFD) as having a moderate overall status, with an ecological status of moderate, a moderate physico-chemical quality, and a hydrological regime of "does not support good" (Environment Agency, 2021).

4.4.6 Discharge permits

Data provided by the Environment Agency in April 2023 shows there is one consented discharge within 2 km of the Site (Figure 3) – the details of which are shown in Table 9. This discharge is domestic sewage from Stonehills Farm.

Table 9 Discharge activity permits

Figure Ref.	Permit Holder	Distance and direction from Site	Discharge Type	Receiving Water Feature
D1	Stonehills Farm	230m northwest	Domestic Property (single including farmhouse)	To land

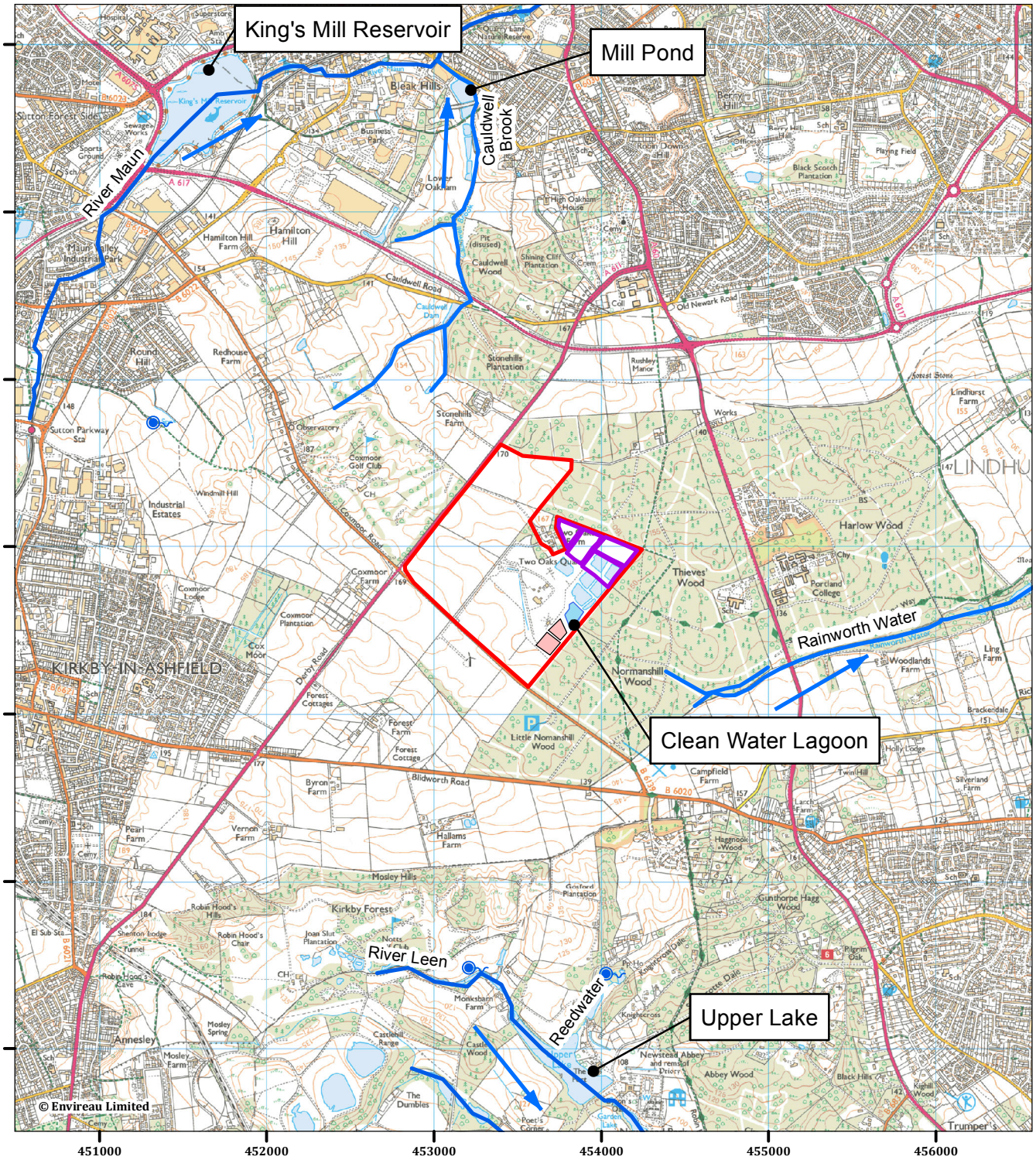
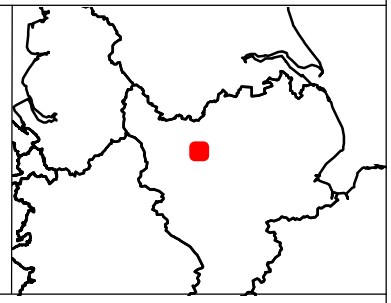


Figure 9: Hydrological Setting

Mansfield, Nottinghamshire

- Site Boundary
- Waste Recovery Boundary
- Waterbody
- Silt Lagoon
- Spring (OS map)
- Watercourse
- Flow Direction

Notes:



0 370 740 1,110 1,480 Meters

Scale: 1:35,000 at A4

12 March 2024

NGR: 453,536 E / 356,874 N

Project No.	3490476
Client:	Mansfield Sand Company Ltd
Drawn by:	JH
Ref:	FIG Hydrology

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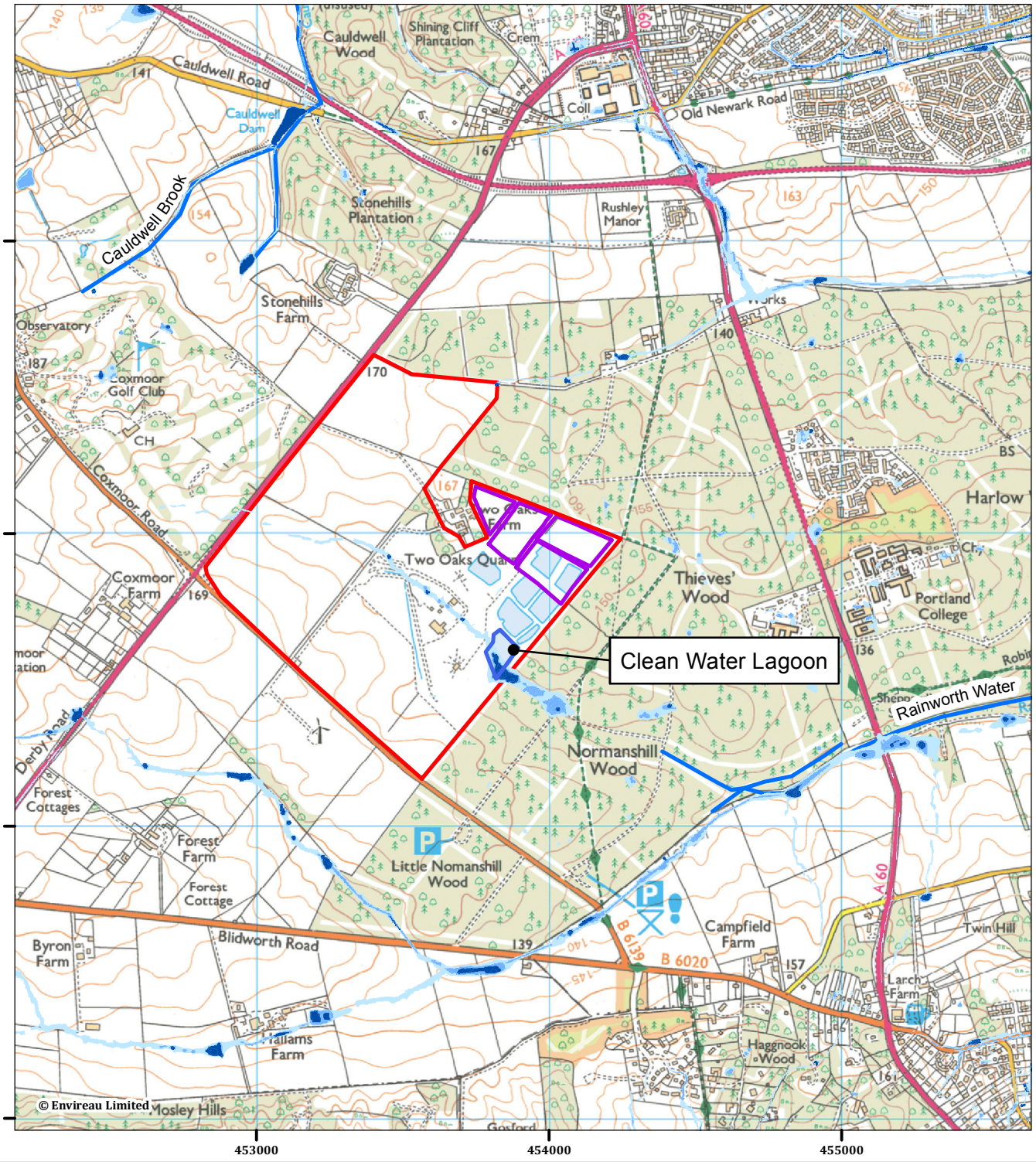
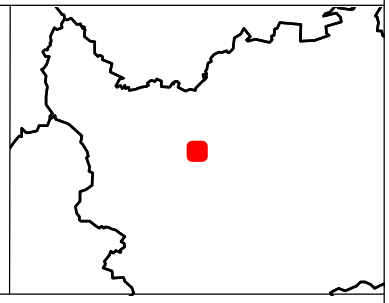


Figure 10: Surface Water Flood Risk

Mansfield, Nottinghamshire

- Site Boundary
- Waste Recovery Boundary
- Clean Water Lagoon
- Watercourse
- Surface Water Flooding 1 in 30
- Surface Water Flooding 1 in 100
- Surface Water Flooding 1 in 1,000

Notes:



0 200 400 600 800 Meters

Scale: 1:20,000 at A4

12 March 2024

NGR: 453,911 E / 356,885 N

Project No. 3490476

Client: Mansfield Sand Company Ltd

Drawn by: JH

Ref: FIG Surface Water Flood Risk

envireau WATER

4.5 Hydrogeology

4.5.1 Classification

The Site lies within the Idle Torne – PT Sandstone Nottinghamshire & Doncaster Water Body (ID: GB40401G301500). In 2019, this groundwater body was classified as having a poor overall status, with a quantitative status of poor and a chemical status of poor (Environment Agency, 2023d). Groundwater abstraction and groundwater resource impacts are the reasons for the poor quantitative status, while the reasons for the chemical status are poor livestock and nutrient management.

The Sherwood Sandstone Group is designated by the Environment Agency as a Principal aquifer. A Principal aquifer is a strategically important rock unit that has a high permeability and water storage capacity. It can provide significant quantities of drinking water.

The underlying Zechstien Group is classified as a Secondary B bedrock aquifer by the Environment Agency. A Secondary B aquifer is defined as lower permeability strata which may have the ability to store and yield limited amounts of groundwater by virtue of localised features such as fractures and weathering.

4.5.2 Aquifer Properties

Groundwater flow in the Sherwood Sandstone Group is predominantly via intergranular flow. Published data on the Sherwood Sandstone Aquifer shows that the Site lies within a region where the hydraulic conductivity ranges from $4x10^{-6}$ to 22.5 m/day, with a geometric mean of 0.87 m/day. Regional test pumping data shows a moderate range in transmissivities between 100-1,000 m^2/day with a regional average transmissivity of 201 m^2/day. (Allen, et al., 1997). Historical borehole records show a borehole constructed in 1999 was pumped at a rate of 55.13 m^3/hr with a drawdown of approximately 4.5 m over 8 hours (British Geological Survey, 2023).

Particle size distribution data of the Chester Formation obtained during exploration drilling has been used to estimate hydraulic conductivity. Using the D_{10} value and the Hazen (1893) formula calculated hydraulic conductivities range between 6 and 20 m/day , which aligns with the higher levels of the published data on Sherwood Sandstone Group.

4.5.3 Groundwater Levels

Groundwater levels have been monitored across the Site at six monitoring locations since April 2023. This has included a combination of manual and automated logging. These boreholes are each screened across the Chester Formation, and their locations are shown on Figure 11. Details of the groundwater monitoring boreholes are presented in Table 10 with the results of the monitoring presented on Figure 12.

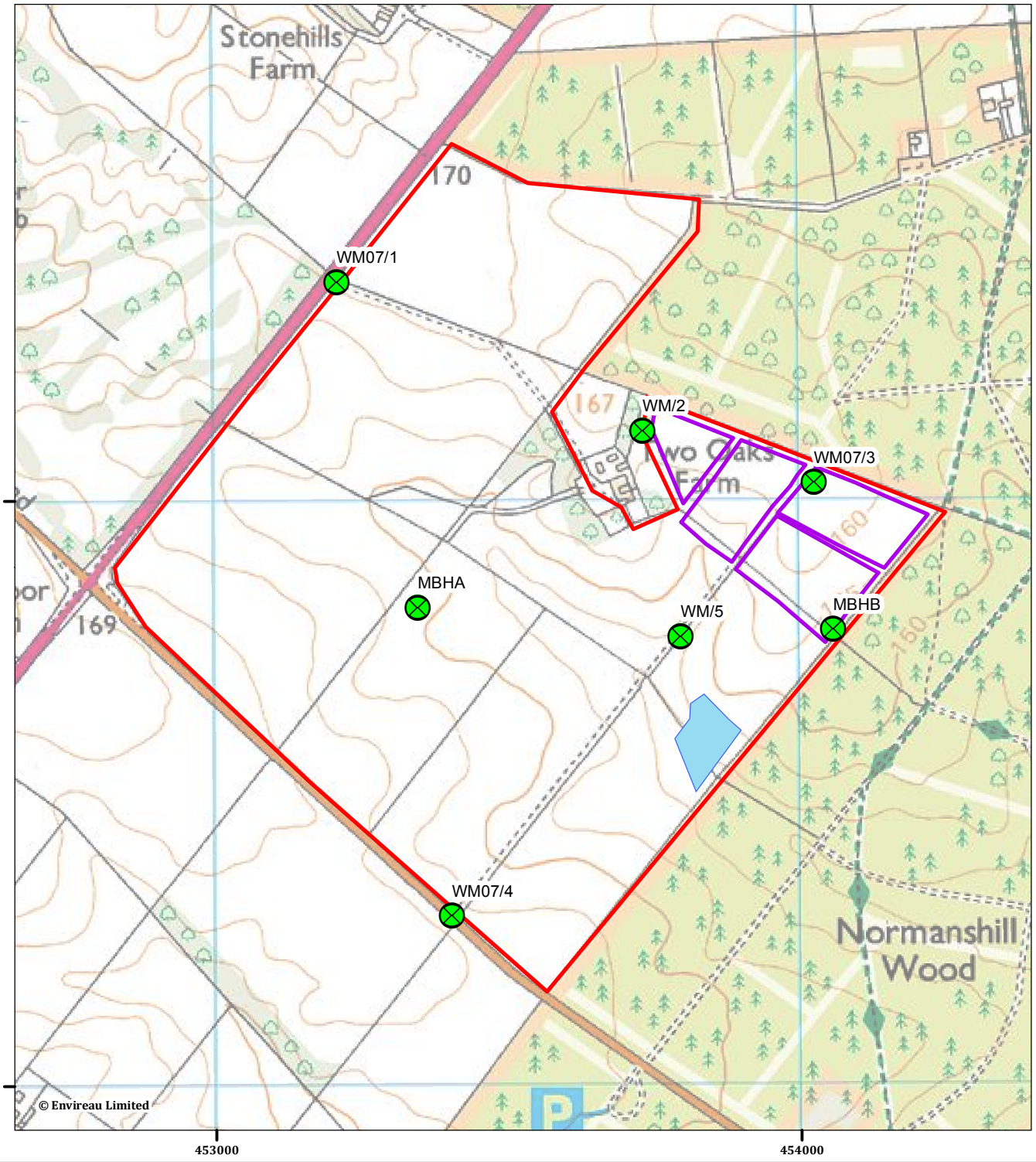
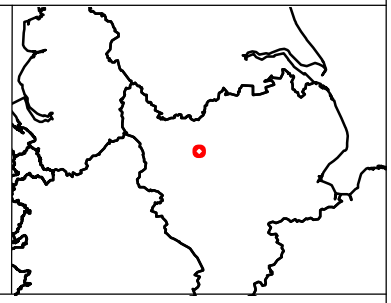


Figure 11: Groundwater Monitoring

Mansfield, Nottinghamshire

- Site Boundary
- Waste Recovery Boundary
- Clean Water Lagoon
- Groundwater Monitoring Borehole

Notes:



0 100 200 300 400 Meters

Scale: 1:10,000 at A4

12 March 2024

NGR: 453,524 E / 356,888 N

Project No.	3490476
Client:	Mansfield Sand Company Ltd
Drawn by:	MT
Ref:	FIG Monitoring Locations

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Table 10 Details of Groundwater Monitoring Boreholes within the Chester Formation

ID	Type	Reading duration	Easting	Northing	Depth (m)	Datum (m AOD)	Groundwater Level (m AOD)		
							Minimum	Mean	Maximum
WM07/1	Manual	April 2023 - present	453212	357370	25.9	164.85	148.90	149.62	150.93
WM/2	Manual and automated	April 2023 - present	453707	357098	32.5	164.90	141.90	142.13	142.47
WM07/3	Manual	April 2023 - present	454026	357040	30	152.07	139.07	139.79	140.56
WM07/4	Manual	April 2023 - present	453410	356295	25	159.29	143.31	144.11	144.32
MBHA	Manual	June 2023 - present	453341	356810	30.4	154.86	145.69	145.91	146.35
MBHB	Manual	June 2023 - present	454053	356774	30.4	149.03	137.75	138.06	138.35

Hydrographs of the groundwater levels recorded in the monitoring boreholes are shown on Figure 12 with groundwater contours of the maximum groundwater conditions from 18 April to 7 December 2023 presented in Figure 13. Key observations from the dataset are summarised below:

- Within the Site, groundwater levels in the Sherwood Sandstone Aquifer range from ~137.75 – 150.93 m AOD, with the highest groundwater levels to the northwest, and the lowest groundwater levels to the southeast.
- All boreholes, excluding WM07/1 located in the north-western part of the Site, have recorded groundwater elevations below that of which the waste recovery material will be deposited.
- A hydraulic gradient of 0.0112 has been estimated across the Site (Figure 13) and shows that groundwater within the Sherwood Sandstone Aquifer falls towards the south-east, approximately in line with the topographic surface.
- Early data collected from WM07/1 shows a fall of groundwater level of ~2 m in May 2023. This short duration fall in groundwater level does not align with the trends observed across the rest of the Site and is considered to be a data collection problem. Therefore, the early data for WM07/1 has not been considered.
- Across the Site the groundwater elevations have varied up to 1.5 m (WM07/3) since monitoring began in April 2023. WM07/1, WM/2, and WM07/4 show a constant increase, however slight, while MBHA and MBHB show a slight variation in groundwater levels that could be attributed to rainfall.

A hydrogeological site model has been produced across the Waste Recovery Area which is shown in Figure 14, with the location of the conceptual cross-section show in Figure 13, and shows that:

- Maximum groundwater elevation varies between 138 and 143 m AOD within the vicinity of the Waste Recovery Boundary, and shows an easterly hydraulic gradient;
- The maximum groundwater elevation will not reach the restoration material to be deposited in the Waste Recovery Boundary;
- Within the Waste Recovery Boundary, there will be an unsaturated pathway of between 3.5 and 8 m between the restoration material and the water table in the Sherwood Sandstone Aquifer; and
- Mineral will be extracted to the contact with the Lenton Sandstone Formation, to a minimum elevation of 134 mA OD.

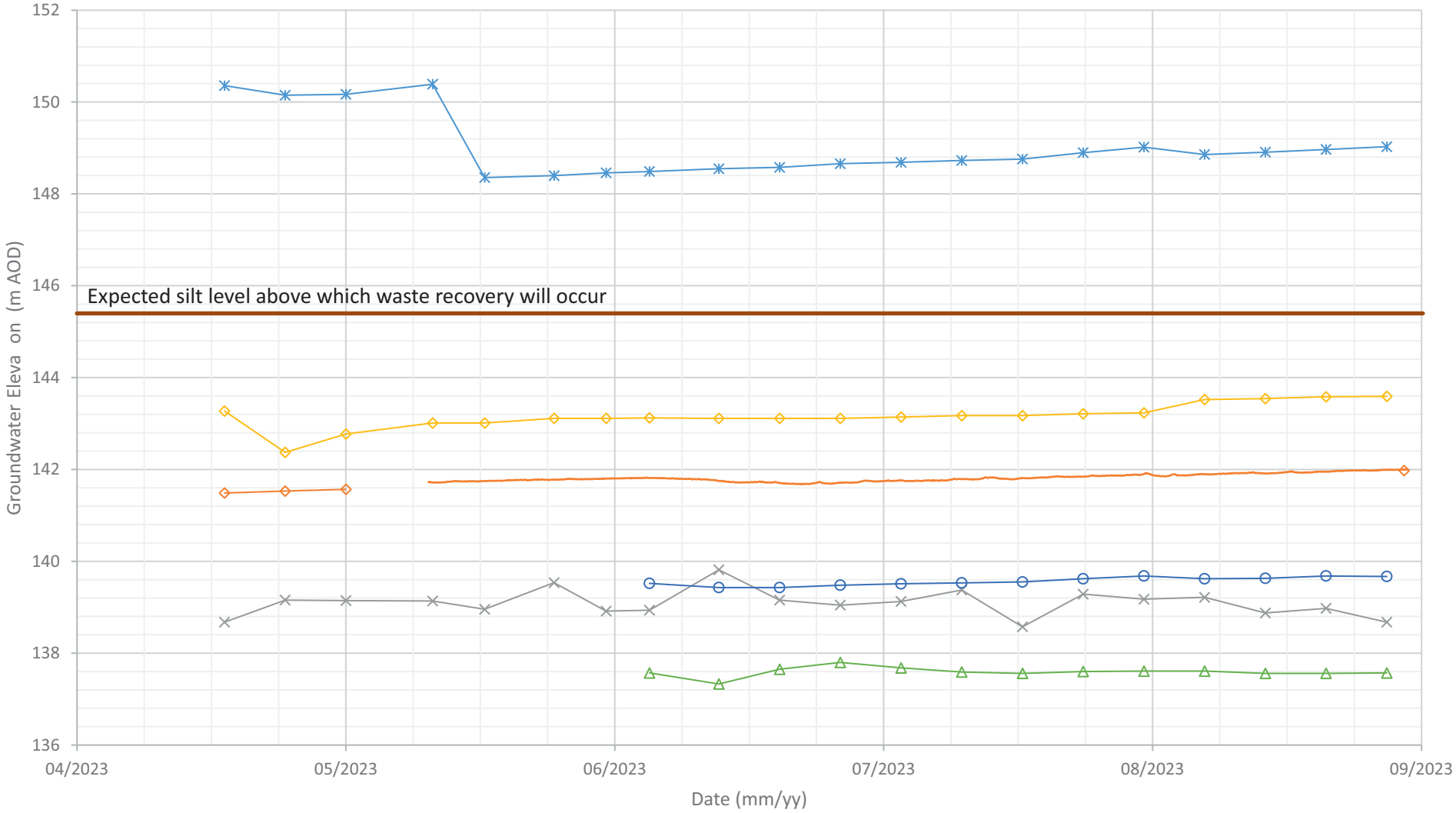


Figure 12: Groundwater hydrographs (April 2023 - present)

WM07/1 (m AOD) | WM/2 (m AOD) | WM07/3 (m AOD) | WM07/4 (m AOD)2
MBHA (m AOD) | MBHB (m AOD) | WM02 Automated | Expected silt level (145.4mAOD)

Date:	20 September 2023
Project No.	3490476
Client:	Mansfield Sand
Ref:	FIG GWE
Drawn by:	DT

envireau WATER

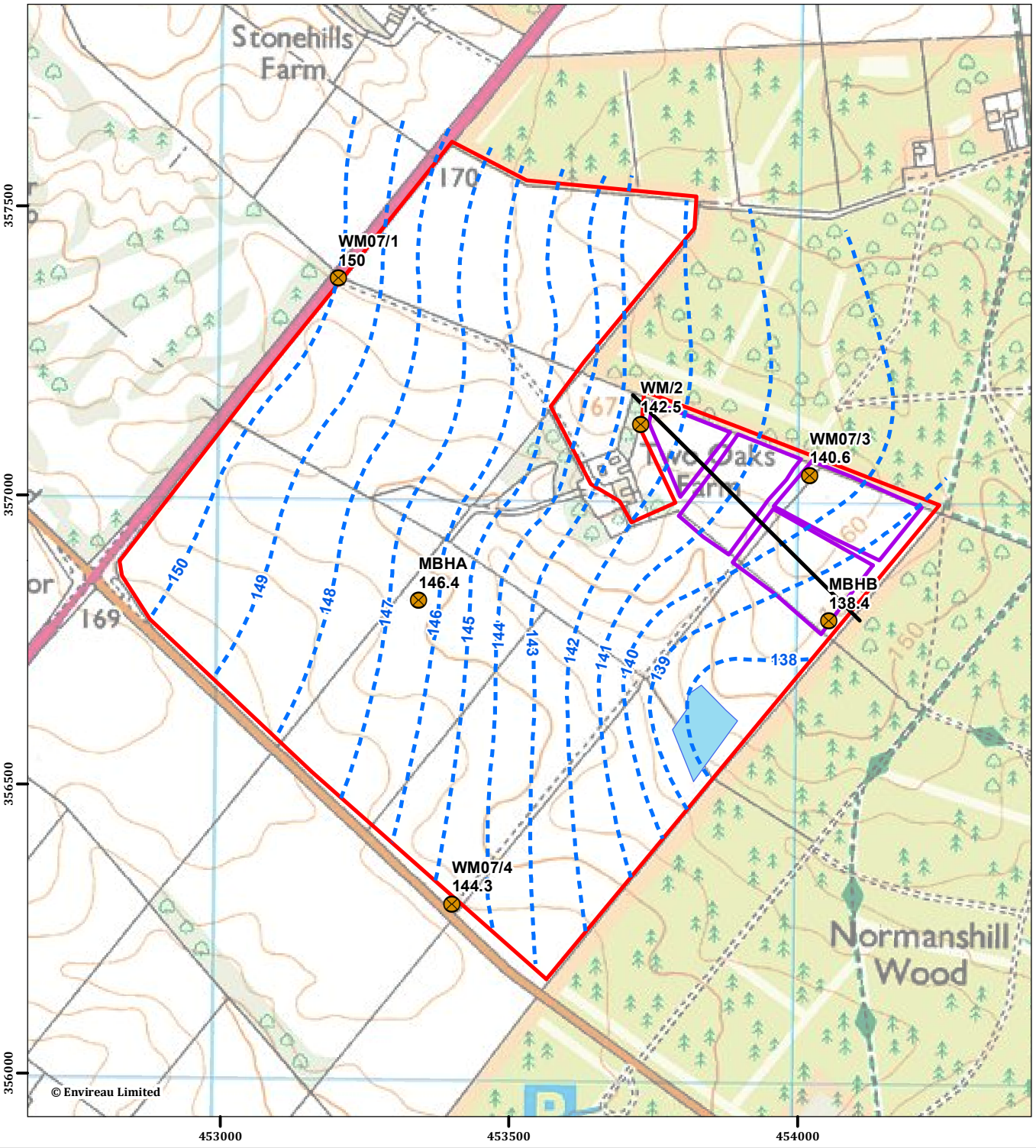
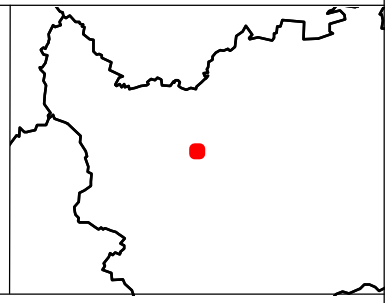


Figure 13: Groundwater Contours

Mansfield, Nottinghamshire

- Site Boundary
- Waste Recovery Boundary
- Clean Water Lagoon
- Conceptual Cross-Section
- Groundwater Contours
- Monitoring Boreholes

Notes:



0 100 200 300 400 Meters

Scale: 1:10,000 at A4

12 March 2024

NGR: 453,536 E / 356,887 N

Project No.	3490476
Client:	Mansfield Sand Company Ltd
Drawn by:	JFR
Ref:	FIG Hydrogeology

envireau WATER

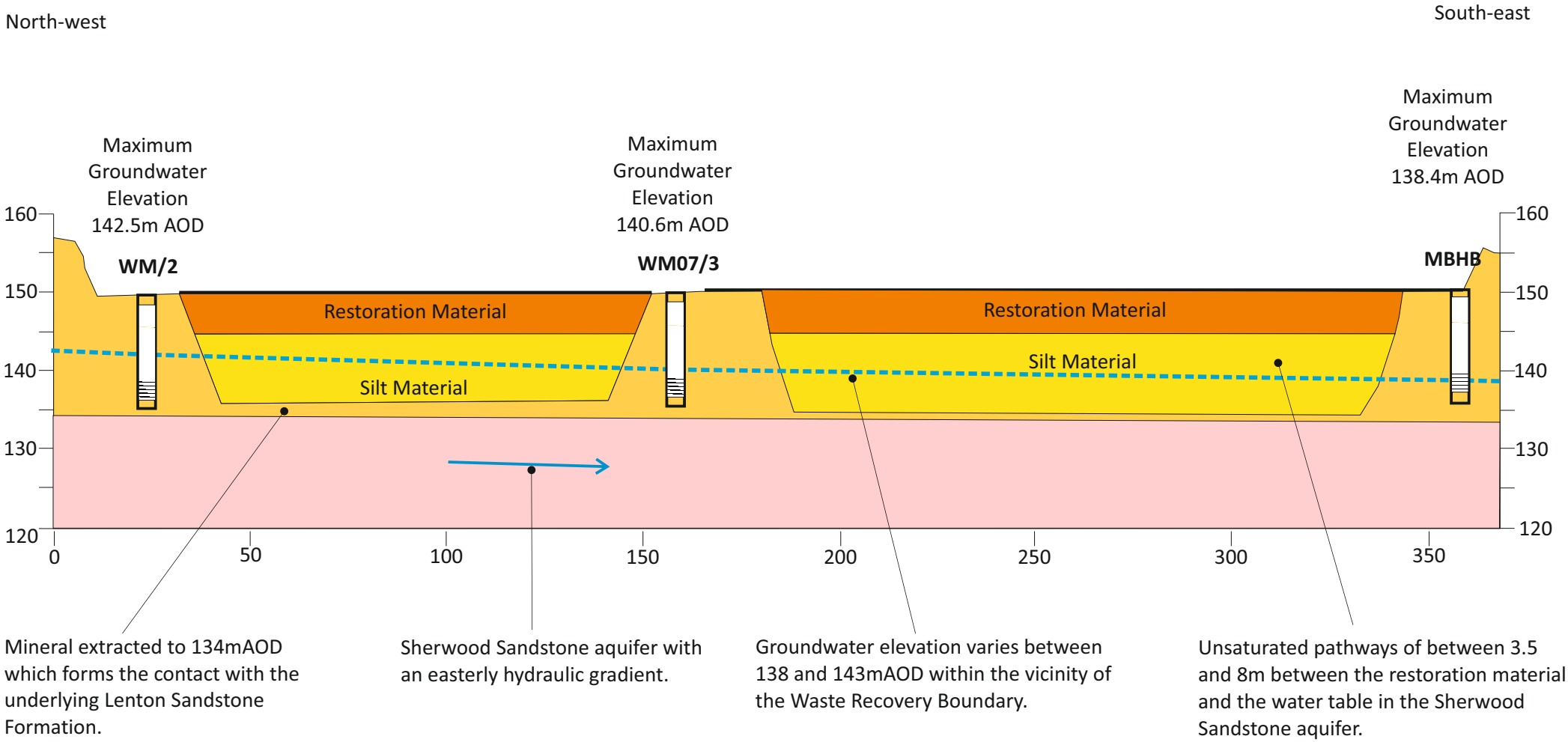


Figure adapted from Lagoon 7&8 Capping produced bty Greenfield Enviro. Dated 29/11/2022.
This drawing has been produced with a 2x vertical exaggeration and off section boreholes.

Figure 14: Conceptual Hydrogeological Site Model

Restoration material

Silt material

Chester Formation (Sherwood Sandstone)

Lenton Sandstone Formation (Sherwood Sandstone)

Maximum groundwater elevation (mAOD)

Date:	05 March 2024
Project No.	3490476
Client:	Mansfield Sand
Ref:	FIG GWE CSM
Drawn by:	DT

envireau WATER

4.5.4 Groundwater quality

Groundwater quality data collection is ongoing. Collection of a groundwater quality baseline commenced in April 2023, and nine samples have been analysed to date. The groundwater samples collected have undergone laboratory analysis for major ions, metals, and hydrocarbons. The results have been compared to Drinking Water Standards (UKDWS), the UKTAG Quantification Limit, and Environmental Quality Standards (EQS) to give an indication of groundwater quality. A summary of the testing undertaken to date is presented in Table 11.

Table 11 Summary of water quality testing undertaken to date

Monitoring Location	27/03/2023	11/05/2023	01/09/2023	14/11/2023	07/12/2023
WM07/1		Y	Y		
WM/2	N	Y	Y		Y
WM07/3					
WM07/4					
WM/5	Y		Pumping		
MBHA	N	N			Y
MBHB	N	N			Y
Rainworth Water		Y	Dry	Y	Y

Y: Sample collected

N: Sample not collected

Laboratory results show that groundwater from the Sherwood Sandstone Aquifer is fresh, with an average electrical conductivity of 390 µS/cm, it has a neutral pH between 6.6 and 8.1, and is slightly hard, with an average hardness of 148 mg/l as $CaCO_3$. Exceedances of the dissolved Nickel EQS have been recorded at borehole WM07/1 on two monitoring rounds; however, exceedances have not been observed in other boreholes or Rainworth Water. Borehole WM/5 recorded a dissolved zinc value of 19 µg/l, above its respective EQS; however, zinc exceedances have not been observed in other boreholes.

High values of dissolved oxygen confirm the unconfined nature of the Sherwood Sandstone Aquifer at the Site, and nitrogen species concentrations are low. One fluoranthene exceedance was reported in borehole WM07/1; however, no other polycyclic aromatic hydrocarbon (PAH) exceedances have been observed. Exceedances of cadmium, copper, lead, mercury, benzo(a)pyrene, benzo(ghi)perylene, benzo(b)fluorantehene, and phenol are related to their high Limit of Detection (LOD), which is greater than their respective screening criteria, rand not detects of these species have been recorded. The results of the water quality testing are presented in full in Appendix E.

4.6 Receptors

4.6.1 Amenity Receptors

Amenity receptors that could be affected by accidental release of contaminants, noise, vibrations, fugitive emissions of dust or gases, mud on roads, odour and litter from Site activities have been identified in the Environmental Risk Assessment (Envireau Water, 2024a).

4.6.2 Groundwater

The restoration material proposed to be accepted at the Site will ensure that no discernible concentrations of hazardous substances will enter groundwater.

The groundwater table will sit below the restoration material to be deposited at the Waste Recovery Boundary; and there will be no ambient groundwater flow through the restoration material. Between 3.5 and 8 m of silt material will lie between the base of each recovered lagoon and the level at which waste will be deposited.

Surface water could infiltrate downwards and through the sides of the combined ~10 m of restored top soil, suitable non-hazardous restoration material, inert restoration material, and 3.5 to 8 m of silt. In this instance the infiltration will reach the Sherwood Sandstone Aquifer, which is taken to be the groundwater receptor.

Three springs are located within 2 km of the Site (see Figure 9); one spring is located 1.6 km to the northwest, while two springs are located 1.7 km to the south.

4.6.3 Surface water

The nearest surface water feature outside the Site is Rainworth Water, which flows north-eastwards. At its closest Rainworth Water lies 500 m east of the Site. The River Leen is located around. 1.7 km to the south. The Upper Lake (an impoundment of the River Leen) is located 1.9 km to the south, while Reedwater is located 1.8 km, also to the south.

4.6.4 Licenced Abstractions

There are six licenced abstractions within 2 km of the Site based on Environment Agency data received in April 2023. Of these, four abstractions are part of the Aquifer Recovery and Recharge Scheme operated by Mansfield Sand to provide water for quarry processing on-Site (see Section 3.9). Table 12 details the abstractions, distance from the Site, their amounts and purpose, with the locations shown on Figure 15.

Table 12 Licenced abstractions within 2 km of the Site

Reference on Figure 15	Name	Source	Operator	Licence ID	Licensed Volume	Use	Distance from the Site
ABS1	Borehole 'D' at Two Oaks Farm Quarry	Ravenshead Unit of Sherwood Sandstone	Mansfield Sand Company Limited	03/28/70/0097/1/R02	19,600 m^3/day	Mineral Washing and Dust Suppression	Within Site

Reference on Figure 15	Name	Source	Operator	Licence ID	Licensed Volume	Use	Distance from the Site
ABS2	Unlined lagoon at two oaks farm quarry	Ravenshead Unit of Sherwood Sandstone	Mansfield Sand Company Limited		5,390,000 m^3/year	Mineral Washing	Within Site
ABS3	Borehole 'B' at Two Oaks Farm Quarry	Mansfield Unit of Zechstien Group Aquifer	Mansfield Sand Company Limited	03/28/70/0096/1/R02	600 m^3/day 200,000 m^3/year	Transfer between sources	Within Site
ABS4	Borehole 'A' at Two Oaks Farm Quarry	Mansfield Unit of Zechstien Group Aquifer	Mansfield Sand Company Limited				Within Site
ABS5	Stonehills Farm - Cauldwell Brook (Reservoir)	Surface Water	Campfield Farms Ltd	03/28/70/0078	2,000 m^3/day 10,000 m^3/year	Spray Irrigation - Direct	500 m northwest
ABS6	Hallams farm	Ravenshead Unit of Sherwood Sandstone	Shiela King and Timothy Shuldan	03/28/63/0086	190 m^3/day 45,000 m^3/year	Spray Irrigation – Direct and Storage and General farming and domestic	1 km south

4.6.5 Source Protection Zones

The entirety of the Site lies within Source Protection Zone (SPZ) Zone 3 (Total Catchment) of a number of abstractions to the east of the Site, abstracting from the Sherwood Sandstone Aquifer (Figure 15). The closest SPZ1 is located ~6.2 km southeast of the Site, associated with an abstraction at Deputy's House near Longdale Plantation.

4.6.6 Private Water Supplies

A response to a Freedom of Information (FOI) request to Ashfield District Council in April 2023 confirmed that there are no Private Water Supplies (PWS) within 2 km of the Site.

4.6.7 Designated Sites (habitats)

There is one designated site within 2 km of the Site. Oakham Local Nature Reserve (LNR) has habitat enhancements for grassland, wetland, and scrub habitats, and is located next to the River Maun, the Mill Pond and the Cauldwell Brook.

Other designated sites located more than 2 km from the Site include the Quarry Lane and the Hermitage LNRs that receive water from the River Maun. The Linby Quarries SSSI located to the south has a biological interest; similarly, the Rainworth Lakes is also classified as a SSSI with a biological interest. The Kirkby Grives and Portland Park occupy a similar area and are classified as SSSI and LNR, respectively. Details and distances to these designated sites are described in Table 13, and locations are shown in Figure 15.

Table 13 Designated Sites

Name	Designation Type	Distance from Site	Reason for Designation	Water Dependent?
Oakham	LNR	1.9 km north	Grassland, wetland, and scrub habitats.	Yes
Quarry Lane	LNR	2.3 km north	Deciduous woodland and riparian habitats along the River Maun	Yes
The Hermitage	LNR	2.5 km north	Pond with reedbeds surrounded by deciduous woodland and ground flora. Supports several bird species.	Yes
Linby Quarries	SSSI	3.2 km south	Biological, grassland and woodland.	Yes
Kirkby Grives and Portland Park	SSSI / LNR	3.2 km south west	Biological, grassland and woodland.	Yes
Rainworth Lakes	SSSI	3.7 km north east	Biological, marsh and swamp. Due to a variety of plant species that grow in the open water and adjacent marsh.	Yes

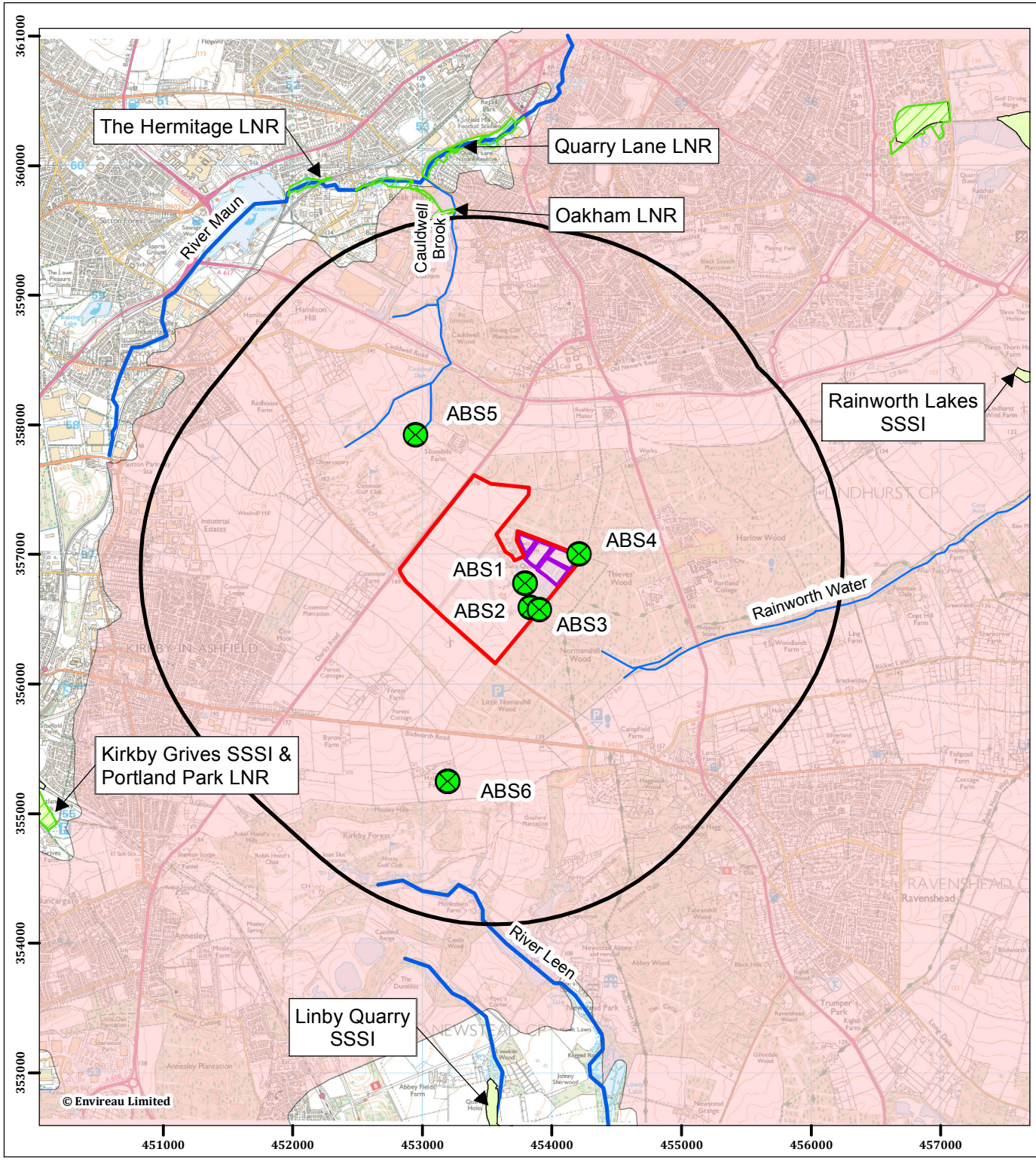
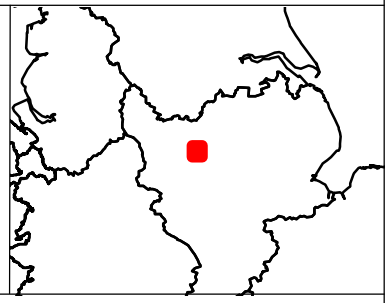


Figure 15: Receptors

Mansfield, Nottinghamshire

- Site Boundary
- Waste Recovery Boundary
- 2km Search Radius
- SPZ
- Local Nature Reserve
- Site of Special Scientific Interest
- EA Licenced

Notes:



0 475 950 1,425 1,900 Meters

Scale: 1:44,000 at A4

12 March 2024

NGR: 453,867 E / 356,827 N

Project No.	3490476
Client:	Mansfield Sand Company Ltd
Drawn by:	JH
Ref:	FIG Receptors

envireau WATER

5 POLLUTION CONTROL MEASURES

5.1 Site Engineering

5.1.1 Basal barrier

The base of the restoration material will be the consolidated/dried silt material that has settled out of suspension from processing at the Site (see Section 3.9). This has been found to have a permeability between 2.3 x 10^{-9} and 4.2 x 10^{-10} m/s (Kiwa CMT, 2023), and is up to 8 m thick within each of the four lagoons. This very low permeability unit will minimise any downward contaminant migration to the underlying Chester Formation.

5.1.2 Sidewall attenuation layer

A sidewall attenuation layer will be constructed from selected imported wastes, which will have sufficient clay content to achieve the required properties for the attenuation layer with a permeability of no more than 1 x 10^{-7} m/s and a thickness of at least 1 m.

The sidewall attenuation layer will be placed dry above the water table.

5.1.3 Capping

No capping is proposed or required as the operation is a deposit for recovery activity. On completion of filling, the Site will be capped with up to 1 m of restoration soils comprising at least 0.5 m of topsoil.

5.1.4 CQA and material characterisation testing

A CQA plan will be put in place to ensure that the attenuation layers are of the correct thickness and permeability and are constructed using suitable materials. The CQA plan will be prepared in accordance with the prevailing guidance (Environment Agency, 2023a).

Prior to acceptance onto the Site, all selected cohesive inert materials will be subject to testing to demonstrate that the material is suitable both physically and chemically. Only materials from non-contaminated sources capable of achieving a permeability of no more than 1 x 10^{-7} m/s. Detailed Waste Acceptance Procedures are set out in the Waste Acceptance Plan that accompanies this application (RSK Geosciences, 2024a).

5.1.5 Dust and Noise

Air Quality and Noise assessments have been undertaken in support of the planning application. Further detail is set out in the ERA (Envireau Water, 2024a).

5.2 Restoration

The Site will be restored to no more than original, pre-development, ground levels in accordance with the restoration plans presented in Appendix D. Following restoration, the Site will be used for agriculture and nature conservation.

There will not be a significant amount of settlement following the completion of the scheme because the imported materials will be inert and not biodegradable. To verify this, a topographical survey will be undertaken as specified in Section 7.

5.3 Post-Closure Controls (Aftercare)

All of the restored areas of the Site will be subject to a comprehensive five-year aftercare scheme.

The Site will continue to be operated and regulated in accordance the Environmental Permit during the aftercare period. The Environmental Permit will be surrendered when it can be demonstrated that the Site no longer poses a risk to the environment or human health.

6 MANAGEMENT AND MONITORING

6.1 Leachate

Due to the chemically inert nature of the restoration material to be accepted at the Site, no leachate management or monitoring is proposed at the Site (see Section 3.5.2).

To ensure that only appropriate materials are accepted into the Site, strict waste acceptance criteria will be implemented. These criteria are set out in the Waste Acceptance Plan (RSK Geosciences, 2024a).

6.2 Groundwater and Surface Water

Information relating to the monitoring requirements for groundwater and surface water onsite during the operational phase will be included in the Site Monitoring Plan (Envireau Water, 2024c).

6.3 Gas

Due to the inert nature of the material that will be accepted at the site, there is low gassing potential. Therefore, no gas management or monitoring is proposed at the Site during the operational period.

6.4 Site Condition Report

A Site Condition Report has been prepared in support of the application (RSK Geosciences, 2024b).

7 CLOSURE

There will be a five-year aftercare period following completion of the Site restoration of the Site and Site closure, as required by planning condition 56. Maintenance work will be carried out during the aftercare period to ensure that the Site does not cause environmental pollution.

A topographical survey will be completed to demonstrate that the restoration has been completed in accordance with the approved restoration plan. The Site will be operated in accordance with the requirements of the Environmental Permit and planning permission.

In accordance with planning condition 58, a final report will be submitted to the MPA after the 5 years after care period is completed. This report will include details of the outcomes of the survey undertaken by a qualified ecologist.

The Site will be operated in accordance with the requirements of the Environmental Permit and planning permission.

Monitoring (i.e. surface water, groundwater, and topographical survey) will be continued during the aftercare period in accordance with the requirements of the Permit, unless otherwise agreed with the Environment Agency. Environment Agency guidance will be used to define appropriate completion criteria for the Site (Environment Agency, 2022) . These criteria will be used to determine when to apply to surrender the Environmental Permit.

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APPENDICES

Appendix A Pre-Application Correspondence

By E-mail only

Our ref: EPR/LB3709UV/A001
Your ref:

Date: 27/09/2023

Dear Deborah Thomas,

Environmental Permitting – Recovery vs Disposal assessment of a waste recovery plan

Pre-application reference: EPR/LB3709UV/A001
Prospective applicant name: Mansfield Sand Company Limited
Site name and address: Two Oaks Quarry, Coxmoor Road, Sutton-in-Ashfield, NG18 5BW

You have submitted information to us that includes your assessment that the activity you wish to undertake at your site amounts to a recovery operation.

We have now considered your submission and we would like to advise you that:

We agree with your assessment that your activity is a recovery operation. This advice is based on the information you have provided to support that the waste is being used as a substitute for non-waste material plus details in relation to waste types and quantity and the purpose and nature of the proposal. If you change any of this information between now and when you submit an application, this advice may no longer apply.

Please note that the advice contained in this letter is not in itself a permitting decision or an indication that a permit will be granted or permit variation issued following submission of an application. Further assessment will take place during the permit determination stage and pre-application advice should be sought as required before preparing an application. See appendix for more information.

The following documents are considered to form the approved waste recovery plan:

Title	Reference (where applicable)	Date
Waste Recovery Plan	N/A	September 2023

Additional comments:

Please note that your proposal to use non-hazardous wastes (as opposed to inert wastes) in the basal layer of high-level lagoons is likely to require further justification during determination of any future permit application.

If you have any questions regarding our advice above please contact me using the details below.

Yours sincerely

Chris Cumming
Permitting Officer, National Permitting Service
Environment Agency | Quadrant 2, 99 Parkway Avenue, Sheffield, S9 4WF

Christopher.Cumming@environment-agency.gov.uk
External: 020 302 58177

Working days: Monday to Friday

Appendix

Recovery vs Disposal advice

The Recovery vs Disposal (RvD) assessment of a waste recovery plan enables us to advise an applicant regarding whether or not we agree in principle that a proposed waste activity is a recovery operation to inform what type of permit would be required (recovery or disposal).

This assessment is discrete from the pre-application advice that would be provided to support the preparation of a permit application (see below) attracting a separate charge.

Our decision to grant a recovery permit or to issue a variation is subject to further assessment carried out during the permit determination stage. In the case of bespoke permit applications, this includes site-specific risk assessment based on the location of the site and technical requirements of the scheme.

For example:

- RvD assessment considers what waste types *may* be suitable, not what waste types *will* be deemed suitable following technical assessment of a permit application which would take into account the sensitivity of the site location and the proposed appropriate measures to be carried out. This is particularly relevant where non-inert wastes are to be deposited.

- RvD assessment considers whether it has been demonstrated that the scheme will be designed and constructed to be fit for purpose. Further technical assessment of the design and the construction methods and/or quality standards to be met may be carried out during permit determination.

If the permit that you are intending to apply for includes the application of waste to improve / enhance or maintain soil quality (landspreading), you must make this clear in your permit application and provide a benefit statement with your application that shows that the specific use of the waste is suitable and will provide no more soils and/or nutrients than the plants need. This is separate to the RvD assessment of the waste recovery plan.

If you plan to mix or blend waste or manufacture a soil substitute under the permit this should be made clear in the permit application as it is a separate activity that will need to be assessed during permit determination.

Pre-application advice on a recovery permit application

Prior to preparing and submitting an application for a recovery permit, you should review our deposit for recovery guidance (https://www.gov.uk/government/publications/deposit-for-recovery-operators-environmental-permits) and consider seeking pre-application advice (https://www.gov.uk/government/publications/environmental-permit-pre-application-advice-form).

You should use the paid for enhanced pre-application advice service to discuss your proposal if any of the following apply:

- your site is in a sensitive location (https://www.gov.uk/guidance/landfill-operators-environmental-permits/plan-the-environmental-setting-of-your-site#sensitive-locations)
- you are depositing waste on top of a landfill
- you are depositing waste into water
- hazardous waste is to be deposited as part of the scheme
- additional activities (such as landspreading or soil treatment) are intended to be included in the permit

Changes to your waste recovery plan

Before making changes to your proposal you should review our waste recovery plan guidance (https://www.gov.uk/government/publications/deposit-for-recovery-operators-environmental-permits/waste-recovery-plans-and-deposit-for-recovery-permits).

Appendix B Planning Permission

Nottinghamshire County Council

Notice of Planning Decision
Town and Country Planning Act 1990

TOWN AND COUNTRY PLANNING (DEVELOPMENT MANAGEMENT PROCEDURE) (ENGLAND) ORDER 2015

APPLICATION REF. NO.:	4/V/2021/0397
APPLICANT:	The Mansfield Sand Company Limited
DEVELOPMENT:	Variation to hours of working and lighting (conditions 21 and 15 of planning permission 4/V/2019/0300). Mineral conveying, processing/treatment, & servicing, testing, maintenance of plant/machinery to 24 hours per day Mondays to Saturdays inclusive. (No working on Sundays or Bank/Public Holidays). No changes to the times for mineral extraction, soils or overburden stripping, or the hours that vehicles may enter or leave the site. Variation to allow for floodlighting during extended working hours
LOCATION:	Two Oaks Quarry, Coxmoor Road, Sutton In Ashfield, NG17 5LZ

Following consideration of an application for the above development as shown on the submitted plans, NOTTINGHAMSHIRE COUNTY COUNCIL, in pursuance of their powers under the above Act, hereby

GRANT PLANNING PERMISSION

for the development in accordance with the application, subject to compliance with the attached conditions and for the following reasons.

Failure to comply with the terms of this permission may render the development unlawful.

Date of decision 16/09/2021

Jonathan Smith

Authorised to sign on behalf of the County Council

DN1 (FULL P.P.)

Appeals to the Secretary of State

If you are aggrieved by the decision of the local planning authority to refuse permission for the proposed development or to grant it subject to conditions, then you can appeal to the Secretary of State under section 78 of the Town and Country Planning Act 1990.

If you want to appeal against the local planning authority's decision then you must do so within six months of the date of this notice

Appeals can be made online at: https://www.gov.uk/planning-inspectorate. If you are unable to access the online appeal form, please contact the Planning Inspectorate to obtain a paper copy of the appeal form on tel: 0303 444 5000.

The Secretary of State can allow a longer period for giving notice of an appeal but will not normally be prepared to use this power unless there are special circumstances which excuse the delay in giving notice of appeal.

The Secretary of State need not consider an appeal if it seems to the Secretary of State that the local planning authority could not have granted planning permission for the proposed development or could not have granted it without the conditions they imposed, having regard to the statutory requirements, to the provisions of any development order, and to any directions given under a development order.

NOTE: THIS PERMISSION REFERS ONLY TO THAT REQUIRED UNDER THE TOWN AND COUNTRY PLANNING ACTS AND DOES NOT INCLUDE ANY CONSENT OR APPROVAL UNDER ANY OTHER ENACTMENT, BYLAW, ORDER OR REGULATION.

APPLICATION REF NO. 4/V/2021/0397

STATEMENT OF POSITIVE AND PROACTIVE ENGAGEMENT

In determining this application the Minerals Planning Authority has worked positively and proactively with the applicant by assessing the proposals against relevant Development Plan policies, all material considerations, consultation responses and any valid representations that may have been received. Issues of concern have been raised with the applicant and addressed through negotiation and acceptable amendments to the proposals. This approach has been in accordance with the requirement set out in the National Planning Policy Framework.

SCHEDULE OF CONDITIONS AND REASONS

Commencement and duration of the permission

1. This permission is for the continuation of the extraction and processing of silica sand, including the provision of a site access road, landscaping and screening bunds. Sand and soil processing plants and other associated infrastructure. Restoration to agriculture and nature conservation. Quarry offices, quarry processing plant, sand drying, sand bagging plant and quarry lagoons subject to not complying with the hours of operation under conditions 21 and 15 as previously approved, but for the avoidance of doubt does not change the authorised hours for undertaking mineral extraction.

   Reason: For the avoidance of doubt and to define the permission and to comply with the requirements of Section 91 (as amended) of the Town and Country Planning Act 1990.

2. The Minerals Planning Authority (MPA) shall be notified in writing of the date of commencement at least 7 days, but not more than 14 days, prior to the commencement of this permission.

   Reason: To assist with the monitoring of the conditions attached to the planning permission and for the avoidance of doubt.

3. The extraction of minerals from the application site shall be completed no later than 13th October 2064.

   Reason: To ensure that mineral extraction is completed within an acceptable timeframe.

Approved plans

4. From the commencement of the development to its completion, a copy of this permission including all plans and documents hereby approved, and any other plans and documents subsequently approved in accordance with this permission, shall always be available at the site offices for inspection by the MPA during normal working hours.

   Reason: To enable the MPA to monitor compliance with the conditions of the planning permission.

5. The development hereby permitted shall only be carried out in accordance with the details contained within the planning application forms, Planning Application

Document and Environmental Statement (ES) received by the MPA on 30 March 2010, and the Regulation 22 Submissions received by the MPA on 30 March 2012, 19 September 2012 and 14 December 2012, including any subsequent approved modifications and in particular the plans and details identified below, unless amendments are made pursuant to the other conditions below:

(i) 'Plan PA2 – Planning Application Area' received by the MPA on 30 March 2010;

(ii) Dwg TW952-D1v2 Rev D and document entitled 'Notes to accompany TW952-D1D received by the MPA (in respect of Condition 6 of Planning Permission 4/2010/0178) on 15 May 2013 and approved in writing by the MPA on 28 May 2013;

(iii) 'Figure L5 – Mitigation Cross Sections' received by the MPA on 30 March 2010;

(iv) Drawings numbered '192-S-03 – Sheet 1 – Access Junction', '192-S-04 – General Arrangement Long Section Chainage 0.000 – 300.000', '192-S-06 – General Arrangement to Show Visibility Splay at Junction' and 192-S-21 – General Arrangement to Show Visibility Splay at Junction – Sheet 2', and the accompanying statement entitled 'Extracts from Richard Parker Consultancy (RPC) report issued in support of the planning application', all received by the MPA on 19 April 2013 and approved in writing by the MPA on 6 June 2013 pursuant to NMA/2810;

(v) Drawing Number PL13-1 Rev 6– Proposed Plant Layout and Elevations and Drawing Number PL13-2 Rev 6– Cross Sections Through Proposed Plant, both received by the MPA on 19 October 2015 and approved on 6 November 2015 in respect of NMA/3385 amending condition 14 of Planning Permission 4/2010/0178 and the subsequent amendments as listed under condition 14 below;

(vi) 'Plan PA10 – Cross-Sections Through Proposed Design' received by the MPA on 30 March 2010;

(vii) Dwg 'Working Method -Phase 1 Revised May 2019' received by the MPA on 3 September 2019 and 'Appendix A- High Level Lagoons' received by the MPA on 28/02/19 (in respect of application ref 4/V/2019/0614) and as further amended by dwg titled 'Quarry Site Plan- May 2020', dated 11/05/2020 and received by the MPA on 10/06/2020 (pursuant to NMA/4144 for a new fresh water storage lagoon in lieu of planned silt lagoon no. 11 within phase 1c).

(viii) Dwg 'Working Method- Phase 2a+2B Revised January 2014' received by the MPA on 11 February 2014 (pursuant to NMA/2994) and approved in writing by the MPA on 7 April 2014.

(ix) 'Plan R22-5 – Working Method – Phase 2c' received by the MPA on 30 March 2012;

(x) 'Plan R22-6 – Working Method – Phase 3' received by the MPA on 30 March 2012;

(xi) 'Plan R22-7 – Working Method – Phase 4a' received by the MPA on 30 March 2012;

(xii) 'Plan R22-8 – Working Method – Phase 4b' received by the MPA on 30 March 2012;

(xiii) 'Plan R22-9 – Final Site Soil Movements' received by the MPA on 30 March 2012;

(xiv) 'Plan PA3 – Proposed Restoration Scheme & Cross Section' received by the MPA on 28 February 2019 (in respect of application ref 4/V/2019/0614).

(xv) 'Plan R22-12 – Site Location and 400m Margin to Residential Properties' received by the MPA on 30 March 2012;

(xvi) Planning application forms and Supporting Statement received by the MPA on 28/02/19. Landscape and Visual Appraisal Statement received 03/09/19;

Reason: To enable the MPA to monitor compliance with the conditions of the planning permission.

Site screening, planting and security

6. Perimeter landscape protection and planting shall be maintained throughout the life of the development in accordance with the following details previously approved by the MPA:

i) Dwg TW952-D1v2 Rev D and document entitled 'Notes to accompany Tw952-D1D received by the MPA (in respect of Condition 6 of Planning Permission 4/2010/0178) on 15 May 2013 and approved in writing by the MPA on 28 May 2013, except where the approved details were subsequently amended by:

ii) Drawing Number PL13-1 Revision 4 – Proposed Plant Layout and Elevations; Drawing Number PL13-2 Revision 4 – Cross Sections Through Proposed Plant; Working Method – Phase 1 Revised January 2014; and Working Method – Phase 2a and 2b Revised January 2014 as approved under NMA/2994 on 7 April 2014 (which permitted the replacement of rabbit proof fencing with individual guards and an extension of the screening bund at the site entrance and incorporated a revised bund alongside Thieves Wood);

iii) Drawings PL13-1 Revision 6 – Proposed Plant Layout and Elevations; and PL13-2 Revision 6 – Cross Sections Through Proposed Plant received by the MPA on 19 October 2015 as approved under NMA/3385 on 6 November 2015.

Reason: In the interests of visual amenity and biodiversity in accordance with policies DM1 and DM4 of the Nottinghamshire Minerals Local Plan.

7. All security fencing erected around the perimeter of the site shall be maintained in accordance with the following details as previously approved by the MPA (in respect of Condition 7 of Planning Permission 4/2010/0178) so as to ensure the site's security throughout the life of the development.

(i) Document entitled 'Condition 7 – Fencing scheme 2, 28 Jan 2013' received on 28 January 2013 and approved in writing by the MPA on 13 March 2013;

(ii) Drawing entitled 'Peart Fencing – Masterview Profile Panel 2.0m x 3.0m' received on 3 January 2013 and approved in writing by the MPA on 13 March 2013;

(iii) Document entitled 'MasterView Profile' received on 3 January 2013 and approved in writing by the MPA on 13 March 2013;

(iv) Drawing Number 'TOF – SF1 – Proposed Security Fencing' received by the MPA on 3 January 2013 and approved in writing by the MPA on 13 March 2013;

(v) Plan PL13-1 Rev 6 – Proposed Plant Layout & Elevations received by the MPA on 19 October 2015 and approved 6 November 2015 pursuant to NMA/3385 (relating to amendments to post and wire fencing in phase 1).

Reason: To ensure the security of the site and also to minimise the opportunity for human disturbance from the site on adjacent habitats suitable for nightjar and woodlark.

Quarry access and protection of the public highway

8. Throughout the life of the development hereby permitted, all vehicles entering and leaving the site shall only use the access road as constructed in accordance with the following details previously approved by the MPA pursuant to NMA/2810 on 6 June 2013:

Drawings numbered '192-S-03 – Sheet 1 – Access Junction', '192-S-04 – General Arrangement Long Section Chainage 0.000 – 300.000', '192-S-06 – General Arrangement to Show Visibility Splay at Junction' and 192-S-21 – General Arrangement to Show Visibility Splay at Junction – Sheet 2', and the accompanying statement entitled 'Extracts from Richard Parker Consultancy (RPC) report issued in support of the planning application', all received by the MPA on 19 April 2013.

Reason: To ensure that all quarry traffic obtains access to the site along a permanently bound hard surfaced road thus ensuring that there is no damage to the public highway and to ensure compliance with Policy DM9 of the Nottinghamshire Minerals Local Plan.

9. The access road shall be maintained in a satisfactory condition at all times to ensure that vehicles travelling between the public highway and the plant site travel along a permanently bound surfaced road.

Reason: To ensure that all quarry traffic obtains access to the site along a permanently bound hard surfaced road thus ensuring that there is no damage to the public highway and to ensure compliance with Policy DM9 of the Nottinghamshire Minerals Local Plan.

10. Measures shall be employed throughout the life of the development to prevent the deposit of mud, clay and other deleterious materials upon the public highway in accordance with the document entitled 'Mansfield Sand, Two Oaks Quarry, Condition 10' received by the MPA on 7 June 2013 and approved in writing by the MPA on 17 June 2013.

Reason: To ensure that no vehicle shall leave the site in a condition whereby mud or other deleterious material is carried onto the public highway in accordance with Policy DM9 of the Nottinghamshire Minerals Local Plan.

11. In the event that the measures approved under Condition 10 above prove inadequate, then within one week of a written request from the MPA, a scheme including revised and additional measures to be taken in order to prevent the deposit of materials upon the public highway shall be submitted to the MPA for its approval in writing. The additional measures to protect the surrounding roads shall be implemented within one month of their approval and thereafter maintained and used at all times.

Reason: *To ensure that no vehicle shall leave the site in a condition whereby mud or other deleterious material is carried onto the public highway in accordance with Policy DM9 of the Nottinghamshire Minerals Local Plan.*

12. Signage erected on the site to notify HGV drivers of the lorry routeing agreement in place shall be maintained for the life of the development in accordance with the previously approved details 'Mansfield Sand, Two Oaks Quarry, Condition 12' received by the MPA on 13 May 2013 (in respect of Condition 12 of Planning Permission 4/2010/0178) and approved in writing by the MPA on 13 May 2013.

Reason: *In the interest of local amenity in accordance with Policy DM1 of the Nottinghamshire Minerals Local Plan.*

13. The number of HGVs entering and leaving the site shall not exceed the following:

a) Except for the period 1 April to 31 July inclusive there shall be no more than 320 HGV movements to and from the site in any one working day (160 in, 160 out) and no more than 1650 HGV movements to and from the site in any one week (675 in, 675 out).

b) For the period 1 April to 31 July inclusive there shall be no more than 380 HGV movements to and from the site in any one working day (190 in, 190 out) and no more than 1950 HGV movements to and from the site in any one week (825 in, 825 out).

Over the course of any calendar year, total HGV movements to and from the site shall not exceed 50,000 (25,000 in, 25,000 out).

Written records shall be maintained of all HGV movements into and out of the site, including HGVs taking sand and sand-based products off site, HGVs delivering soils, compost and other materials into the site, and HGVs delivering plant and machinery to the site for operations such as soil stripping, with the records kept for a minimum period of two years. Copies of the HGV vehicle movement records shall be made available to the MPA within 7 days of a written request being made by the MPA.

Reason: *To limit vehicle movements at the proposed quarry in accordance with Policy DM9 of the Nottinghamshire Minerals Local Plan.*

Quarry plant area

14. The quarry plant area, plant, equipment and supporting infrastructure shall be maintained in accordance with the following previously approved details:

(a) Dwgs PL13-1 Rev 6– Proposed Plant Layout and Elevations and PL13-2 Rev 6– Cross Sections Through Proposed Plant, (both received by the MPA on 19 October 2015 and approved by the MPA on 6 November 2015 in respect of NMA/3385 amending condition 14 of Planning Permission 4/2010/0178 and as further amended by:

(b) Dwg 'TO 18-1 V3 Proposed Site Offices' received by the MPA on 27/11/08 along with the accompanying photographs (additional photographs received on 20/11/18) pursuant to NMA3928 approving additional site offices etc on 04/12/18;

(c) Dwgs 'Gravel Plant Location & Lagoon 11 Design – Plant Area November 2019' dated 27/11/19, 'Gravel Plant Location & Lagoon 11 Design – Quarry Area November 2019' dated 09/08/19 and 'Indicative Gravel Plant Sections' dated 27/11/19 received by the MPA on 29/11/19 along with the accompanying overview document received by the MPA on 11/07/19, pursuant to NMA4018 approving a revised gravel washing plant on 29/11/19 and;

(d) Dwg titled 'Gravel Stocking Area Design' dated 15/10/2020, received by the MPA on 30/10/2020 (Revision to include cut 1 and cut 2) pursuant to NMA/4194 for an enlarged gravel stocking area.

Reason: In the interest of visual amenity to ensure compliance with Policy DM1 of the Nottinghamshire Minerals Local Plan and to protect the openness of the Green Belt in accordance with the National Planning Policy Framework.

15. Unless a new scheme is subsequently approved by the MPA pursuant to this condition, all floodlighting to be used at the site shall be maintained for the life of the development in accordance with Drawing Number D21071/PY/I, dated 22/04/21 and received by the MPA on 28/04/21 and the accompanying statement - Condition 15 Floodlighting Revised (appendix D) received by the MPA on 06/05/21.

Floodlighting shall be angled downwards and suitably shielded to ensure that it does not result in glare or dazzle to surrounding land, property and other users and shall ensure that no lighting levels over 1Lux occurs in habitat suitable for nightjar and woodlark during the bird breeding season (February to August).

The floodlighting shall not be used on Sundays, Bank or Public Holidays. Outside these hours any external lighting shall be individually operated through a movement sensor switch with a maximum lighting cycle not exceeding 5 minutes.

Reason: In the interest of visual amenity and to ensure compliance with Policy DM1 of the Nottinghamshire Minerals Local Plan.

16. Throughout the life of the development hereby permitted, the external appearance of all fixed plant, equipment and supporting infrastructure shall be maintained to the satisfaction of the MPA in order to preserve their original external appearance. Any works which the MPA considers are required to maintain the external appearance of all fixed plant, equipment and supporting infrastructure shall be carried out within one month of a written request being made by the MPA.

Reason: In the interest of visual amenity and to ensure compliance with Policy DM1 of the Nottinghamshire Minerals Local Plan.

17. Notwithstanding the provisions of the Town and Country Planning (General Permitted Development) (England) Order 2015, or any subsequent amended legislation, no buildings, fixed plant, or machinery, other than those approved under Condition 14 above, shall be erected or placed on the site without the prior written approval of the MPA.

Reason: To protect the openness of the Green Belt in accordance with the National Planning Policy Framework.

Phasing and cessation of mineral extraction

18. Mineral extraction shall only be carried out in accordance with the phasing plans listed in condition 5 above. Mineral extraction in any phase or sub-phase shall not commence until mineral extraction has been completed, or substantially completed, within the preceding phase or sub-phase to the satisfaction of the MPA. The MPA shall be notified in writing of the date of commencement of mineral extraction in any phase or sub-phase at least seven days, but not more than 14 days, prior to the commencement of mineral extraction in that phase or sub-phase.

Reason: To ensure the phased working and timely restoration of the site in accordance with Policy DM12 of the Nottinghamshire Minerals Local Plan.

19. The MPA shall be notified in writing of the date of the cessation of mineral extraction.

Reason: To enable the MPA to monitor compliance with the conditions of the planning permission.

20. All plant, equipment and supporting infrastructure shall be removed from the site and the site shall be entirely restored within 12 months of the cessation of mineral extraction, as notified under Condition 19 above.

Reason: To secure proper restoration of the site within an acceptable timescale and in accordance with Policy DM12 of the Nottinghamshire Minerals Local Plan.

Hours of working

21. Except in the case of an emergency when life, limb or property are in danger (with such instances being notified in writing to the MPA within 48 hours of their occurrence), or with the prior written approval of the MPA, the following shall not take place except within the hours specified below, except as provided for in Condition 22 below:

	Mondays to Fridays	Saturdays	Sundays Bank/ Public Holidays
Mineral Extraction	6am to 8pm	7am to 1pm	Not at all
Mineral conveying, processing or treatment	24 hours	24 hours	Not at all
Stripping, replacement, regrading or ripping of soils or overburden	7am to 7pm	7am to 1pm	Not at all
Servicing, testing, or maintenance of plant or machinery	24 hours (urgent or emergency situations only 8pm-6am)	24 hours (urgent or emergency situations only 8pm-6am)	Only with the prior written consent of the MPA
Vehicles entering and leaving the site for the purposes of collecting	6.30am to 7.30pm	7.30am to 12.30pm	Not at all

mineral or delivering soils, compost and synthetic fibres			

Reason: *To minimise the impact of the development on the amenity of the local area in accordance with Policy DM1 of the Nottinghamshire Minerals Local Plan, to minimise the impact of the development on the public highway network in accordance with Policy DM9 of the Nottinghamshire Minerals Local Plan, and to reduce the disturbance on nearby breeding birds in accordance with the Conservation of Habitats and Species Regulations 2010.*

22. Notwithstanding the hours of operation detailed in Condition 21 above, mineral extraction, including the use of two motorised scrapers, a dozer and the conveyor, shall not take place between 6am and 7am within the 400 metre buffer zones identified on 'Plan R22-12 – Site Location and 400m Margin to Residential Properties' received by the MPA on 30 March 2012. Where mineral extraction is taking place in close proximity to any of the 400 metre buffer zones, the extent of the buffer zones shall be clearly marked in accordance with details previously submitted to, and approved in writing by, the MPA.

Reason: *To minimise the noise impact of the development on the amenity of the local area, in accordance with Policy DM1 of the Nottinghamshire Minerals Local Plan.*

Noise

23. All mobile plant, machinery and vehicles (excluding delivery vehicles which are not owned or under the direct control of the operator) used on the site shall incorporate white noise reversing warning devices and be fitted with silencers maintained in accordance with the manufacturers' recommendations and specifications to minimise noise disturbance to the satisfaction of the MPA.

Reason: *To minimise the noise impact of the development on the amenity of the local area, in accordance with Policy DM1 of the Nottinghamshire Minerals Local Plan, and to ensure that breeding birds are not adversely affected.*

24. The free field noise levels associated with the development, when measured in the curtilage of any of the noise-sensitive properties listed below, shall not exceed the following limits measured as an Equivalent Continuous Noise Level for a 1 hour LAeq (free field):

Criterion Noise Levels LAeq, 1 hour			
Location	LAeq (7am – 7pm)	LAeq (7pm – 10pm)	LAeq (10pm– 7am)
Bright Sparks/ Stonehills House, Derby Road	55	52	42

Coxmoor House, Derby Road	55	52	42
Forest Farm, off Derby Road	55	52	42
Forest House, Thieves Wood Lane	55	52	42

Reason: *To minimise the noise impact of the development on the amenity of the local area, in accordance with Policy DM1 of the Nottinghamshire Minerals Local Plan.*

25. Prior to commencing mineral extraction in each of phases 3 and 4, where this would involve any new or relocated conveyor system, an updated Noise Impact Assessment shall be submitted to and approved in writing by the MPA. The assessment shall inform the methods of working and design/location of any conveyor system and shall demonstrate that the noise limits set out in conditions 24 and 27 can be complied with.

Reason: *To inform the future design and working arrangements for phases 3 and 4 should this involve conveying of minerals and to ensure that noise levels including from extended night time operations would be minimised and remain within the noise limits set to protect nearby residential and ecological receptors.*

26. Notwithstanding the requirements of Condition 24 above, for temporary operations such as soil stripping, replacement and bund formation, the LAeq 1 hour (free field) noise level in the curtilage of any noise sensitive property shall not exceed 70 dB(A). Temporary operations which exceed the normal day to day criterion shall be limited to a total of eight working weeks in a year at any individual noise sensitive property. The dates of these occurrences shall be recorded and available to the MPA in writing with one week of a written request from the MPA.

Reason: *To minimise the noise impact of the development on the amenity of the local area, in accordance with Policy DM1 of the Nottinghamshire Minerals Local Plan.*

27. Operational noise at the site shall be managed in accordance with the 'Protocol for Control of Noise to Protect Nightjar and Woodlark' – May 2013, received by the MPA on 10 May 2013 and approved in writing by the MPA on 30 May 2013 (in respect of Condition 26 of Planning Permission 4/2010/0178), whereby it shall be ensured that the continuous sound level from the site does not exceed 55 dB LAeq and the peak sound level does not exceed 80 dB LA(max) at any point on land surrounding the site that has the potential to support breeding nightjar and woodlark.

In accordance with the approved details, the following details shall be submitted to the MPA for its approval in writing throughout the life of the development (except where otherwise stated):

i) An annual review of potential new breeding areas for nightjar and woodlark created by forestry operations on adjacent land, to be carried out in advance of the breeding season;

ii) The results of noise monitoring carried out in January or February each year in positions adjacent to any potential nesting/breeding areas for nightjar and woodlark;

iii) The results of noise monitoring carried out periodically throughout the nightjar and woodlark breeding seasons adjacent to areas identified as potential nesting sites.

The approved noise management measures shall be implemented in accordance with the approved details throughout the life of the development.

Reason: To ensure that breeding birds are not adversely affected by the development in accordance with the National Planning Policy Framework and to also protect the amenity of nearby recreational users.

Dust

28. Measures shall be taken to minimise the generation of dust and reduce its impact on nearby dust sensitive receptors, including the Sherwood Observatory, nearby properties and habitats suitable for nightjar and woodlark, to acceptable levels and provide for dust monitoring.

The dust management plan ('Dust Management Plan V.1 – 9.01.2013' received by the Minerals Planning Authority on 22 March 2013 and approved on 3 June 2013 (in respect of Condition 27 of Planning Permission 4/2010/0178)) shall be implemented for the life of the development.

Reason: To ensure that dust impacts associated with the operation of the development are minimised, in accordance with Policy DM1 of the Nottinghamshire Minerals Local Plan.

29. All HGVs entering the site to deliver soil, compost, and synthetic fibres, and all HGVs leaving the site with sand and sand-based products, shall be fully sheeted.

Reason: To ensure that dust impacts associated with the operation of the development are minimised, in accordance with Policy DM1 of the Nottinghamshire Minerals Local Plan.

Archaeology

30. Development shall progress in accordance with the approved Archaeological Mitigation Strategy by Pre-Construct Archaeological Services Ltd, received by the MPA on 12 April 2013 and approved in writing by the MPA on 21 May 2013 (in respect of Condition 29 of Planning Permission 4/2010/0178), including the programme of further archaeological investigations required by this strategy which shall be completed and the findings submitted to the MPA for its approval in writing prior to any works commencing on phases 2 and 3.

Reason: *To ensure that that adequate archaeological investigation and recording is undertaken prior to the development taking place, in accordance with policies SP5 and DM6 of the Nottinghamshire Minerals Local Plan.*

Stockpile heights

31. Following the commencement of extraction from Phase 1b, stockpiles in the plant site area including stockpiles of excavated (as dug) minerals; site-sourced soils waiting to be processed; imported soils, compost and synthetic fibres waiting to be processed; and processed materials shall not exceed 10 metres above the ground levels of the plant site as set out in the details submitted and approved under Condition 14 above.

Reason: *In the interest of visual amenity to ensure compliance with Policy DM1 of the Nottinghamshire Minerals Local Plan and to protect the openness of the Green Belt in accordance with the National Planning Policy Framework.*

Mineral extraction

32. Mineral extraction shall only be carried out using two motorised scrapers, and a dozer. All excavated mineral shall be transported from the working phase to the processing plant area by field conveyor only. The conveyor shall be maintained throughout the life of the development hereby permitted to the satisfaction of the MPA.

Reason: *To minimise the impact of the development on the amenity of the local area, in accordance with Policy DM1 of the Nottinghamshire Minerals Local Plan.*

33. No blasting shall take place on the site in association with the mineral extraction hereby permitted.

Reason: *To minimise the impact of the development on the amenity of the local area in accordance with Policy DM1 of the Nottinghamshire Minerals Local Plan.*

34. Only sand and gravel extracted from within the site, as detailed on 'Plan PA2 – Planning Application Area' received by the MPA on 30 March 2010, shall be processed on the site. No sand and gravel shall be imported into the site for processing.

Reason: *To limit vehicle movements at the proposed quarry in accordance with Policy DM9 of the Nottinghamshire Minerals Local Plan.*

Pollution control

35. A scheme for surface water drainage for the site shall be implemented and maintained in accordance with the following details previously approved by the MPA on 30 May 2013 (in respect of Condition 34 of Planning Permission 4/2010/0178):

a) Documents entitled 'Design Philosophy for Surface Water Drainage Revision 1'; 'Halfren Water Report'; and 'Two Oaks Quarry -Environmental Statement' all received by the MPA on 10 April 2013;

b) Drawings Numbered '192-S-02 (Site Plan) B'; '192-S-03 (Junction GA) F'; '192-S-04 (Long Section 0-300) G'; '192-S-05 (Long section 300 - 500) F'; '192-S-06 (Visibility Splay sheet 1) E'; '192-S-07 (Parking Layby) C'; '192-S-08 (Corner to plant area) C'; '192-S-09 (Section @30m) E'; '192-S-10 (Section @50m 100m) G'; '192-S-11 (Section @150m 200m) E'; '192-S-12 (Section @250m) D'; '192-S-13 (Section @300m) D'; '192-S-14 (Section @350m) D'; '192-S-15 (Section @400m) D'; '192-S-16 (Section @450m) B'; '192-S-17 (Section @500m) A'; '192-S-18 (Section @525m) A' all received by the MPA on 20 March 2013.

c) Surface Water Calculations received by the MPA on 20 March 2013;

d) Documents entitled 'Balancing Lagoons –No Discharge Off Site' and 'Balancing Lagoons – Greenfield Run-Off Rate' both received by the MPA on 15 May 2013.

Reason: *To prevent the increased risk of flooding, to improve and protect water quality, improve habitat and amenity, and ensure future maintenance of the surface water drainage system in accordance with Policy DM2 of the Nottinghamshire Minerals Local Plan.*

36. A scheme for the disposal of foul drainage shall be implemented in accordance with the following details previously approved by the MPA on 30 May 2013 (in respect of Condition 35 of Planning Permission 4/2010/0178):

a) Document entitled 'Design Philosophy for Foul Water Drainage – Revision 1';

b) Document entitled 'Biotec 1 and Biotec 2 – Installation and Operation Guidelines';

c) Document entitled 'Biotec 3 and Biotec 4 – Installation and Operation Guidelines';

d) Document entitled 'Installation Guidelines for BioDisc Units BA, BAx, BB and NB';

e) Document entitled 'Installation Guidelines for BioDisc Units BC, NC';

f) Drawing Number 'DS1146P: BA-BB-BAx BioDisc Gravity Sales Drawing';

g) Drawing Number DS0456P: 'BC BioDisc General Dimensions Customer Drawing';

h) Document entitled 'BioDisc Sewage Treatment Plans Units BA – BG';

i) Document entitled 'Siting and Installation Considerations for BioDisc Units BA – BG and Nitrification Versions';

j) Drawing Number '192-S-38: Weigh Bridge and Office Proposed Foul Drainage Plan.

All received by the MPA on 10 April 2013.

Reason: *To ensure the satisfactory means of foul drainage disposal from the site in accordance with Policy DM2 of the Nottinghamshire Minerals Local Plan.*

37. Prior to being discharged into any watercourse, surface water sewer or soakaway system, all surface water from parking areas, and hard standings susceptible to oil contamination shall be passed through an oil separator designed and constructed to have a capacity compatible with the site being drained. Roof water shall not pass through the oil separator which shall be maintained in accordance with the manufacturer's instructions throughout the life of the development.

Reason: *To protect the water environment in accordance with Policy DM2 of the Nottinghamshire Minerals Local Plan.*

38. Any facilities for the storage of oils, fuels or chemicals shall be sited on impervious bases and surrounded by impervious bund walls. The volume of the bunded compound shall be at least equivalent to the capacity of the tank plus 10%. If there is multiple tankage, the compound should be at least equivalent to the capacity of the largest tank, of the combined capacity of the interconnected tanks, plus 10%. All filling points, vents, gauges, and sight glasses must be located within the bund. The drainage system of the bund shall be sealed with no discharge to any watercourse, land, or underground strata. Associated pipework should be located above ground and protected from accidental damage. All filing points and tank overflow pipe outlets should be detailed to discharge downwards into the bund.

Reason: To prevent pollution of the water environment in accordance with Policy DM2 of the Nottinghamshire Minerals Local Plan.

Ecology

39. Prior to the commencement of mineral extraction in each phase or sub-phase, ecological management plans shall be submitted to the MPA for its approval in writing. The plans shall detail measures to improve the biodiversity of those areas of the site not subject to operational activities and shall include, but not necessarily be limited to, any or all of the following measures as appropriate:

(i) Management of hedgerows to increase their size and density to the benefit of breeding birds and bats;

(ii) The provision of suitable field margins (wild bird seed areas) sown with high energy seed yielding plant species that shall remain intact during the winter months;

(iii) The location of the wild bird seed areas shall be notified in writing to the MPA each year within two weeks of being sown.

(iv) Timescales for the provision and ongoing maintenance of the proposed measures.

Additionally with respect to phase 1:

a) The wild bird seed areas shall continue to be sown, established and maintained in accordance with the details in the document entitled 'Condition 38: Ecological Management Plan' produced by Eco-Tech and received by the MPA on 24 April 2013 (pursuant to Condition 38 of Planning Permission 4/2010/0178) albeit that the location of the areas shall be rotated from year to year;

b) The location of the wild bird seed areas shall be notified in writing to the MPA each year within two weeks of being sown;

The ecological management plans shall be implemented in accordance with the approved details.

Reason: In the interest of protecting species and their habitats in accordance with the National Planning Policy Framework.

40. Site clearance works within each phase and sub-phase, and that involve the destruction and removal of vegetation, including felling, clearing or removal of trees, shrubs or hedgerows or the removal of any standing crops, shall not commence until

all potential habitats for protected species have been investigated by a qualified ecologist and a report of the investigation has been submitted to, and approved in writing by, the MPA. In the event that protected species or nesting birds are present, the report shall provide a working design, method and timetable to mitigate any undue adverse effects on the species involved. The mitigation measures shall be implemented as approved prior to any site clearance works taking place within that phase.

Reason: In the interest of protecting species and their habitats in accordance with the National Planning Policy Framework.

Soil stripping, handling and storage

41. The MPA shall be notified in writing at least 5 working days before soil stripping is due to commence on any phase or sub-phase, or part phase or part sub-phase in the event that a phase or sub-phase is not stripped in its entirety in one stripping campaign.

Reason: To ensure the proper restoration of the site, conserving and managing all available soil resources, in accordance with Policy DM3 of the Nottinghamshire Minerals Local Plan.

42. Soil handling shall be undertaken in accordance with the general Soil Handling and Soil Movement Scheme for Two Oaks Quarry received by the MPA on 19/4/13 (under 4/2010/0178). A detailed soil handling scheme for each phase, sub-phase, part phase or part sub-phase of the development shall be submitted in writing to the MPA at least one month prior to the stripping of any soil from that area of the site. Such a scheme shall include the following details:

(i) The size, location, volume and composition of soil storage mounds;

(ii) A methodology statement for the stripping and storage of soils;

(iii) The types of machinery to be used;

(iv) The routes to be taken by plant and machinery involved in soil handling operations;

(v) The depths of subsoil and topsoil to be stripped;

(vi) Which soils are to be retained for restoration purposes and which are to be used in the production of 'fibresand' products.

The soil handling schemes shall be carried out in accordance with the approved details.

Reason: To ensure the proper restoration of the site, conserving and managing all available soil resources, in accordance with Policy DM3 of the Nottinghamshire Minerals Local Plan.

43. No plant or vehicles shall cross any area of unstripped topsoil or subsoil except where such trafficking is essential and unavoidable for purposes of undertaking permitted operations. Essential trafficking routes shall be marked in such a manner as to give effect to this condition. No part of the site shall be excavated or traversed or used for a road, or storage of topsoil, subsoil or mineral deposits, until all available topsoil and subsoil has been stripped from that part.

Reason: *To ensure the proper restoration of the site, conserving and managing all available soil resources, in accordance with Policy DM3 of the Nottinghamshire Minerals Local Plan.*

44. Soil stripping shall not commence until any standing crop or vegetation has been cut and removed.

Reason: *To ensure the proper restoration of the site, conserving and managing all available soil resources, in accordance with Policy DM3 of the Nottinghamshire Minerals Local Plan.*

45. Topsoil, subsoil, and soil making material shall only be stripped when they are in a dry and friable condition and movements of soils shall only occur:

(i) When all soil above a depth of 300mm is in a suitable condition that it is not subject to smearing;

(ii) When topsoil is sufficiently dry that it can be separated from subsoil without difficulty;

(iii) When there are no areas of standing water on the surface of soils in the area to be stripped, traversed or used for soil storage.

Reason: *To ensure the proper restoration of the site, conserving and managing all available soil resources, in accordance with Policy DM3 of the Nottinghamshire Minerals Local Plan.*

46. All further storage mounds that will remain in situ for more than 6 months, or over winter, shall be seeded within 3 weeks of their construction with British Seed House A4 Low Maintenance seed mix at 35g/m2 unless an alternative seed mix is otherwise previously agreed in writing by the MPA. Seeding should aim to provide a suitable grass sward on the outside faces of any perimeter storage mounds/screening bunds and a winter supply of high energy seed yielding plant species on the inside faces as well as on all internal soil storage mounds. The mounds shall thereafter be maintained free of weeds until used for restoration purposes.

Reason: *To ensure the proper restoration of the site, conserving and managing all available soil resources, in accordance with Policy DM3 of the Nottinghamshire Minerals Local Plan and in the interests of biodiversity.*

47. Details of the volumes and locations of soils stored on the site shall be submitted to the MPA by 31 December each year.

Reason: *To ensure there are sufficient soils available for the restoration of the site and to ensure all available soil resources are conserved and managed, in accordance with Policy DM3 of the Nottinghamshire Minerals Local Plan.*

Phased restoration

48. Details of the restoration of the four main phases of the site and the plant site shall be submitted in writing to the MPA within the following timescales:

Phase	Date for restoration details to be submitted
1	Within 12 months of the completion of mineral extraction within phase 1a
2	Within 12 months of the completion of mineral extraction in phase 2a
3	Within 12 months of the commencement of mineral extraction in phase 3
4	Within 12 months of the completion of mineral extraction in phase 4a
Plant site	Within 12 months of the commencement of mineral extraction in phase 4b

Reason: To ensure the phased working and restoration of the site in accordance with Policy DM12 of the Nottinghamshire Minerals Local Plan.

Soil replacement for agricultural and woodland restoration

49. The MPA shall be notified in writing at least 5 working days before each of the following:

(i) Overburden/sand substrate has been prepared ready for soil replacement to allow inspection of the area before further restoration of this part is carried out; and

(ii) When subsoil has been prepared ready for topsoil replacement to allow inspection of the area before further restoration of this part is carried out; and

(iii) On completion of topsoil replacement to allow an opportunity to inspect the completed works before the commencement of any cultivation and seeding operation.

Reason: To ensure the proper restoration of the site, conserving and managing all available soil resources, in accordance with policies DM3 and DM12 of the Nottinghamshire Minerals Local Plan.

50. Topsoils and subsoils shall only be replaced when they and the ground on which they are to be placed are in a dry and friable condition and no movements, respreading, levelling, ripping or loosening of subsoils or topsoils shall occur:

(i) When it is raining; or

(ii) When there are pools of water on the surface of the storage mound or receiving area.

Reason: To ensure the proper restoration of the site, conserving and managing all available soil resources, in accordance with policies DM3 and DM12 of the Nottinghamshire Minerals Local Plan.

51. Plant and vehicles shall not cross any area of replaced and loosened ground, replaced subsoil, or replaced topsoil except where essential and unavoidable for the

purposes of carrying out soil replacement, ripping and stone picking or beneficially treating such areas. Only low ground pressure machines shall work on prepared ground.

Reason: To ensure the proper restoration of the site, conserving and managing all available soil resources, in accordance with policies DM3 and DM12 of the Nottinghamshire Minerals Local Plan.

52. Prior to the placement of any subsoils, the quarry floor shall be ripped to a minimum depth of 250mm with tine spacings no wider than 1.5m.

Reason: To ensure the proper restoration of the site, conserving and managing all available soil resources, in accordance with policies DM3 and DM12 of the Nottinghamshire Minerals Local Plan.

53. The top soil and upper subsoils shall be replaced to an overall combined depth of no less than 750mm.

Reason: To ensure the proper restoration of the site, conserving and managing all available soil resources, in accordance with policies DM3 and DM12 of the Nottinghamshire Minerals Local Plan.

54. The re-spread subsoil shall be approximately, and at least a minimum of, 350mm in depth and shall be cross-ripped:

(i) To provide loosening to a minimum depth of 400mm with tine spacings no wider than 1.5m, and

(ii) Any rock, boulder or larger stone greater than 200mm in any dimension shall be removed from the loosened surface before further soil is laid. Materials that are removed shall be utilised for the creation of refugia areas for reptiles and amphibians, or buried at a depth not less than 2 metres below the final settled contours.

Reason: To ensure the proper restoration of the site, conserving and managing all available soil resources, in accordance with policies DM3 and DM12 of the Nottinghamshire Minerals Local Plan and in the interest of habitat creation.

55. The re-spread topsoil shall be approximately, but no more than a maximum of, 400mm in depth and shall be rendered suitable for agricultural cultivation by loosening and ripping:

(i) To provide loosening to a minimum depth of 450mm with tine spacings of 1.5 metres or closer;

(ii) Any non-soil making material or rock or boulder or larger stone lying on the loosened topsoil surface and greater than 100mm in any dimension shall be utilised for the creation of refugia areas for reptiles and amphibians, or buried at a depth not less than 2 metres below the final settled contours.

Reason: To ensure the proper restoration of the site, conserving and managing all available soil resources, in accordance with policies DM3 and DM12 of the Nottinghamshire Minerals Local Plan and in the interest of habitat creation.

Restoration of areas to heathland, wetland areas and woodland

56. Within the timescales prescribed in Condition 48 above for those phases, part phases, sub-phases or part sub-phases to be restored to heathland, wetland areas and woodland, details of the restoration of those areas shall be submitted to the MPA for its approval in writing. The details shall be in accordance with 'Plan PA3 – Proposed Restoration Scheme & Cross Section' received by the MPA on 28 February 2019 with the aim of creating a mosaic of heathland, acid grassland, short ephemeral vegetation and bare ground with a varied micro-topography, including areas of open water of varying sizes and in clusters, and clumps of scrub and oak-birch woodland. The details shall include the following:

(i) The results of a walk-over survey carried out to identify evidence of, or potential for, protected species along with the results of any further detailed protected species carried out as necessary;

(ii) The results of surveys carried out to identify features that have arisen naturally or as a consequence of excavation works which are of value (or have the potential to be of value) in the context of creating a diverse heathland habitat, and details of how the survey results have been taken into account when drawing up the restoration details;

(iii) Target habitats with reference to the UK Biodiversity Action Plan;

(iv) Woodland, wetland margin and heathland species mixes and establishment methods which should be of native genetic origin and appropriate to the local area, including the source of heather brash and numbers, species, planting, positions and sizes of all trees and shrubs;

(v) Substrate preparation (where required), including the creation of micro-topography features;

(vi) Details of the reshaping of the silt lagoons in phase 1 to a shallower edge profile;

(vii) Habitat transition areas between the agricultural grassland areas and the heathland areas;

(viii) Sandstone faces;

(ix) The provision of appropriate refugia areas for reptiles and amphibians using, where appropriate, any rocks, boulders or stones picked in accordance with Conditions 54 and 55 above;

(x) Timetable for the implementation of the restoration works.

The restoration of the site shall be provided in accordance with the approved details.

Reason: *To ensure the phased restoration of the site in accordance with Policy DM12 of the Nottinghamshire Minerals Local Plan and to provide for extensive heathland and acid grassland afteruse in accordance with Policy SP2 of the Nottinghamshire Minerals Local Plan.*

Aftercare

57. Following the restoration of any phase or sub-phase of the site, that phase or sub-phase shall undergo aftercare management for a 5 year period.

Reason: *To provide for the aftercare of the restored site, in accordance with Policy DM12 of the Nottinghamshire Minerals Local Plan.*

58. Prior to any phase or sub-phase being entered into aftercare, the extent of the area and its date of entry into aftercare shall be agreed in writing with the MPA. The 5 year aftercare period shall run from the agreed date.

Reason: *To provide for the aftercare of the restored site, in accordance with Policy DM12 of the Nottinghamshire Minerals Local Plan.*

59. An aftercare scheme and strategy for each phase or sub-phase shall be submitted for the written approval of the MPA at the same time as the submission of the restoration details for that phase or sub-phase in accordance with the timescales detailed in Condition 48 above. The aftercare scheme and strategy shall outline the steps to be taken, the period during which they are to be taken, and who will be responsible for taking those steps to ensure the land is restored and brought back to its intended restored afteruse. The aftercare scheme shall include but not be restricted to details of the following:

(i) Cultivations;

(ii) Weed control;

(iii) Scrub control on heathland areas;

(iv) Sowing of seed mixtures;

(v) Soil analysis;

(vi) Keeping of records and an annual review of performance and proposed operations for the coming year, to be submitted to the MPA between 31 March and 31 May each year;

(vii) Drainage amendments;

(viii) Subsoiling and underdrainage proposals;

(ix) Management practices such as the cutting of vegetation;

(x) Tree protection;

(xi) Remedial treatments;

(xii) Irrigation;

(xiii) Fencing;

(xiv) Proposals for a survey visit by a suitably qualified ecologist, to be undertaken in year 5, to assess the ecological interest of those parts of the site restored to heathland, wetland areas and woodland, including their habitats, flora and flora, to inform management practices for the additional periods of aftercare secured through legal agreement; and

(xv) A report detailing the findings of the survey visit referred to in (xiv) above, to be submitted to the MPA at the end of year 5.

Reason: *To provide for the aftercare of the restored site, in accordance with Policy DM12 of the Nottinghamshire Minerals Local Plan.*

60. Site management meetings shall be held with the MPA each year to assess and review the detailed annual programmes of aftercare operations referred to in

Condition 59 (vi) above, having regard to the condition of the land, progress in its rehabilitation and necessary maintenance.

Reason: To provide for the aftercare of the restored site, in accordance with Policy DM12 of the Nottinghamshire Minerals Local Plan.

61. The aftercare programme shall be implemented in accordance with the details approved under Condition 59 (vi) above, as amended following the annual site meeting carried out in accordance with Condition 60 above.

Reason: To provide for the aftercare of the restored site, in accordance with Policy DM12 of the Nottinghamshire Minerals Local Plan.

Alternative Restoration

62. Should, for any reason, mineral extraction from the application site cease for a period in excess of 12 months, then, within three months of the receipt of a written request from the MPA, a revised scheme for the restoration of the site shall be submitted in writing to the MPA for its approval in writing. Such a scheme shall include details of the final contours, provision of soiling, sowing of heathland habitat, planting of trees and shrubs, drainage and fencing in a similar manner to that submitted with the application and modified by these conditions.

Reason: To secure the proper restoration of the site within an acceptable timescale.

63. The revised restoration scheme approved under Condition 62 shall be implemented within 12 months of its approval by the MPA, and shall be subject to the aftercare provisions of Conditions 59 – 61 above.

Reason: To secure the proper restoration of the site within an acceptable timescale.

NOTES TO APPLICANT

1. **The development hereby permitted must be carried out in accordance with the conditions attached to this planning permission and any approved plans and details. Failure to implement the permission in accordance with the planning conditions and approved details may render the development unlawful and could lead to enforcement action and prosecution.**

2. **If, at any stage, it becomes necessary to vary any of the approved plans or details you should contact the County Planning Authority in advance of implementing any changes to ascertain whether the proposed changes require any further planning approval.**

3. **Where appropriate there is a fee payable, currently £116, where a written request is made for the discharge of one or more conditions on the same permission or for confirmation that condition(s) on a permission have been complied with. The fee is payable for each request and not for each condition. When submitting a fee, please provide the planning application reference number. Fees can be paid in several ways, either:**

- **using a debit/credit card by calling 0115 9932584;**
- **by paying online at www.nottinghamshire.gov.uk/planning-and-environment/planning-applications/pay-a-planning-fee; or**
- **by sending a cheque payable to 'Nottinghamshire County Council' to the Planning Support Officer, Development Management, Nottinghamshire County Council, County Hall, Loughborough Road, West Bridgford Nottingham, NG2 7QP. Please mark the envelope 'Private and Confidential'.**

4. **Where pre-commencement conditions may be specified in this decision notice, the justification as to why such conditions are imposed and need to be discharged prior to the commencement of development is stated in accordance with Article 35 of The Town and Country Planning (Development Management Procedure) (England) Order 2015.**

5. **This notice of planning permission and the attached conditions should be read alongside the associated Section 106 legal agreement dated 19 September 2017.**

6. **Your attention is drawn to the consultation responses from the Environment Agency dated 23 June 2010, Central Networks dated 6 May 2010 and the Highways Authority dated 9 November 2012 copies of which have been previously forwarded.**

7. **It is the objective of the Nottinghamshire Minerals Local Plan (Policy SP3) that all aspects of minerals development should minimise impacts on the causes of climate change by reducing greenhouse gas emissions and move towards a low-carbon economy. Technological improvements (particularly LEDs) mean that there are more energy efficient floodlighting products on the market compared to the existing fittings. The company should take the opportunity to review the floodlighting and the energy and costs savings that may be available from fitting new products.**

8. **Your attention is drawn to the Standing Advice from The Coal Authority set out below.**

DN1-759

APPLICATION REF NO. 4/V/2021/0397

IMPORTANT NOTICE: STANDING ADVICE
Planning Application Consultations with the Coal Authority

The proposed development lies within an area that has been defined by the Coal Authority as containing potential hazards arising from former coal mining activity at the surface or shallow depth. These hazards can include: mine entries (shafts and adits); shallow coal workings; geological features (fissures and break lines); mine gas and former surface mining sites. Although such hazards are seldom readily visible, they can often be present and problems can occur in the future, particularly as a result of development taking place.

It is recommended that information outlining how the former mining activities may affect the proposed development, along with any mitigation measures required (for example the need for gas protection measures within the foundations), is submitted alongside any subsequent application for Building Regulations approval (if relevant).

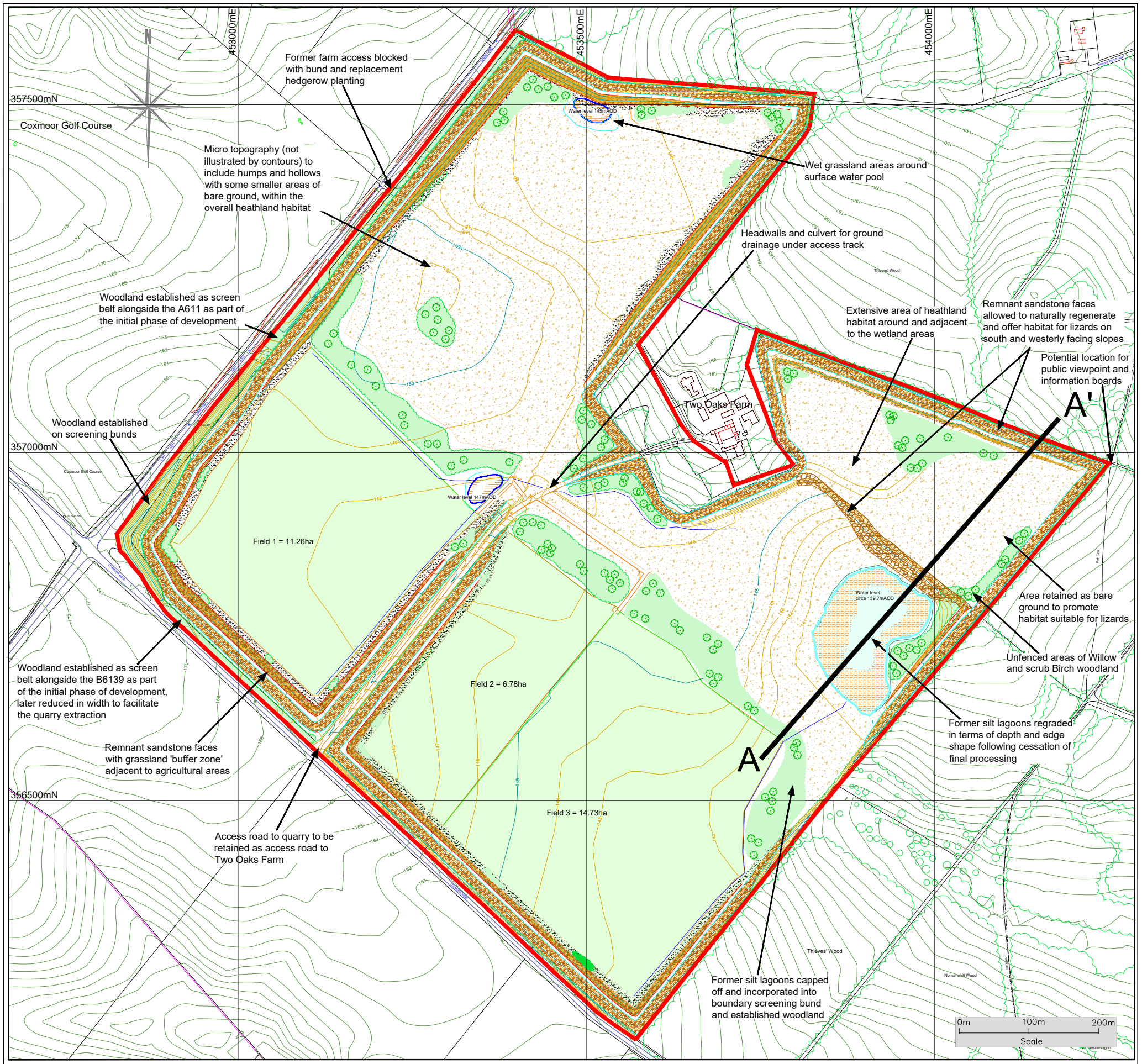
Any form of development over or within the influencing distance of a mine entry can be dangerous and raises significant land stability and public safety risks. As a general precautionary principle, the Coal Authority considers that the building over or within the influencing distance of a mine entry should be avoided. In exceptional circumstance where this is unavoidable, expert advice must be sought to ensure that a suitable engineering design which takes into account all the relevant safety and environmental risk factors, including mine gas and mine-water. Your attention is drawn to the Coal Authority Policy in relation to new development and mine entries available at:
www.gov.uk/government/publications/building-on-or-within-the-influencing-distance-of-mine-entries

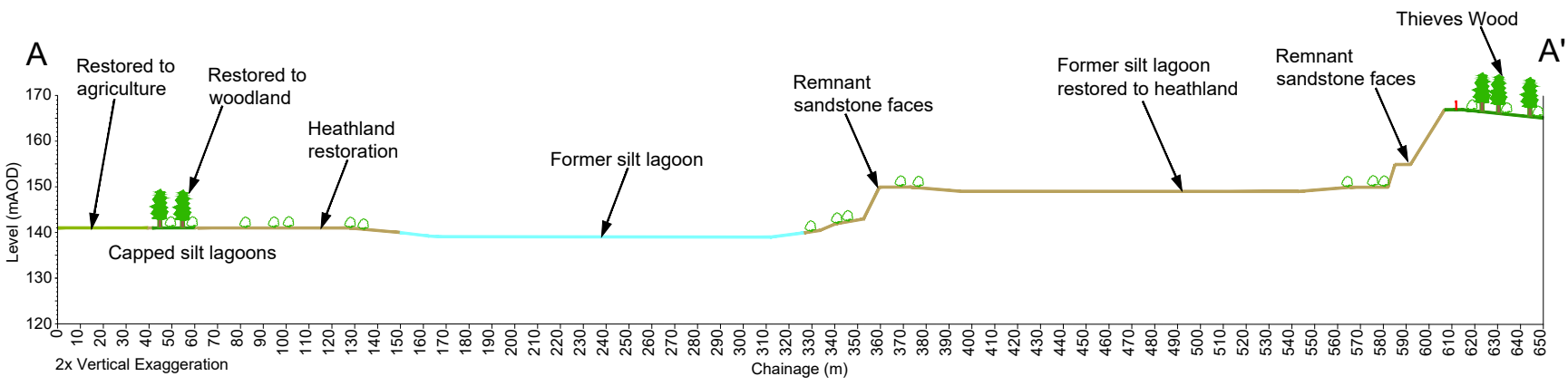
Any intrusive activities which disturb or enter any coal seams, coal mine workings or coal mine entries (shafts and adits) requires a Coal Authority Permit. Such activities could include site investigation boreholes, excavations for foundations, piling activities, other ground works and any subsequent treatment of coal mine workings and coal mine entries for ground stability purposes. Failure to obtain a Coal Authority Permit for such activities is trespass, with the potential for court action.

If any coal mining features are unexpectedly encountered during development, this should be reported immediately to the Coal Authority on 0345 762 6848. Further information is available on the Coal Authority website at:
www.gov.uk/government/organisations/the-coal-authority

Informative Note valid from 1st January 2021 until 31st December 2022.

Appendix C Development Plans





Site
Two Oaks Quarry
Kirkby in Ashfield

Project
Conceptual Restoration

Title
Plan PA3 - Proposed Restoration Scheme & Cross Section

Key

- Proposed Restoration Contours
- Proposed Grassland
- Proposed Woodland
- Proposed Wetland Area
- Proposed Shallow Wetland Areas
- Proposed Heathland

Map Scale:	1:6,000 @A3
Section Scale:	1:3,000 @A3
Project No.	MSF/TOF/116
File:	TOQ Restoration Nov 2018 section.dwg
Drawn by:	TJS
Date:	25th February 2019

Notes
Site surveyed by Greenfield Associates January 2008
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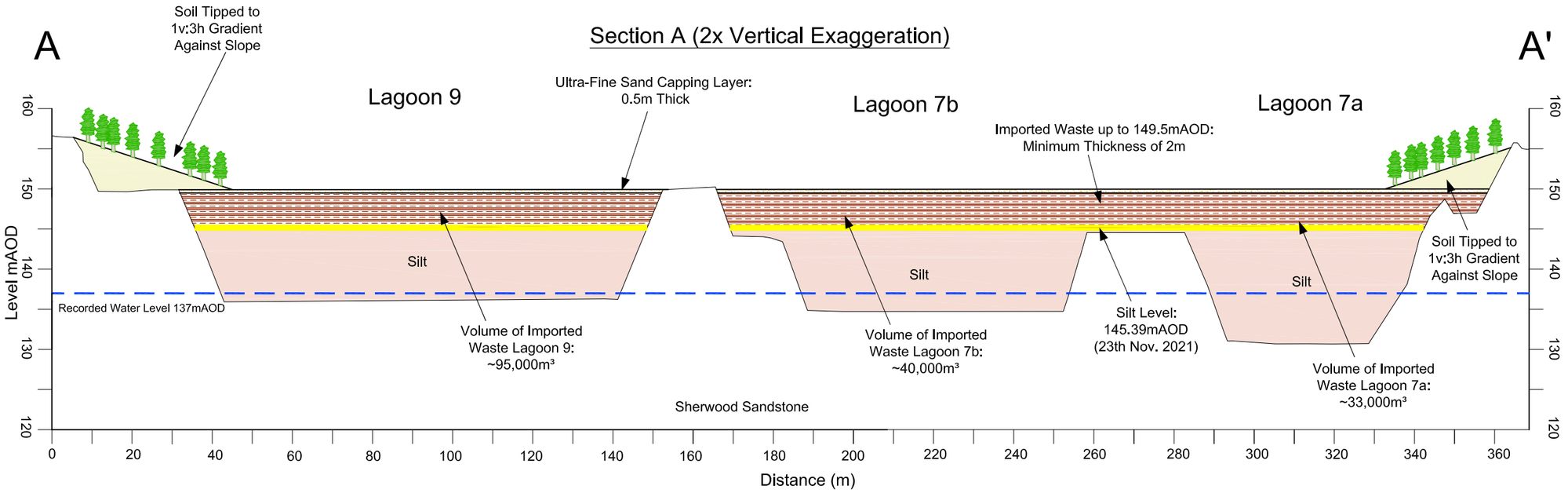
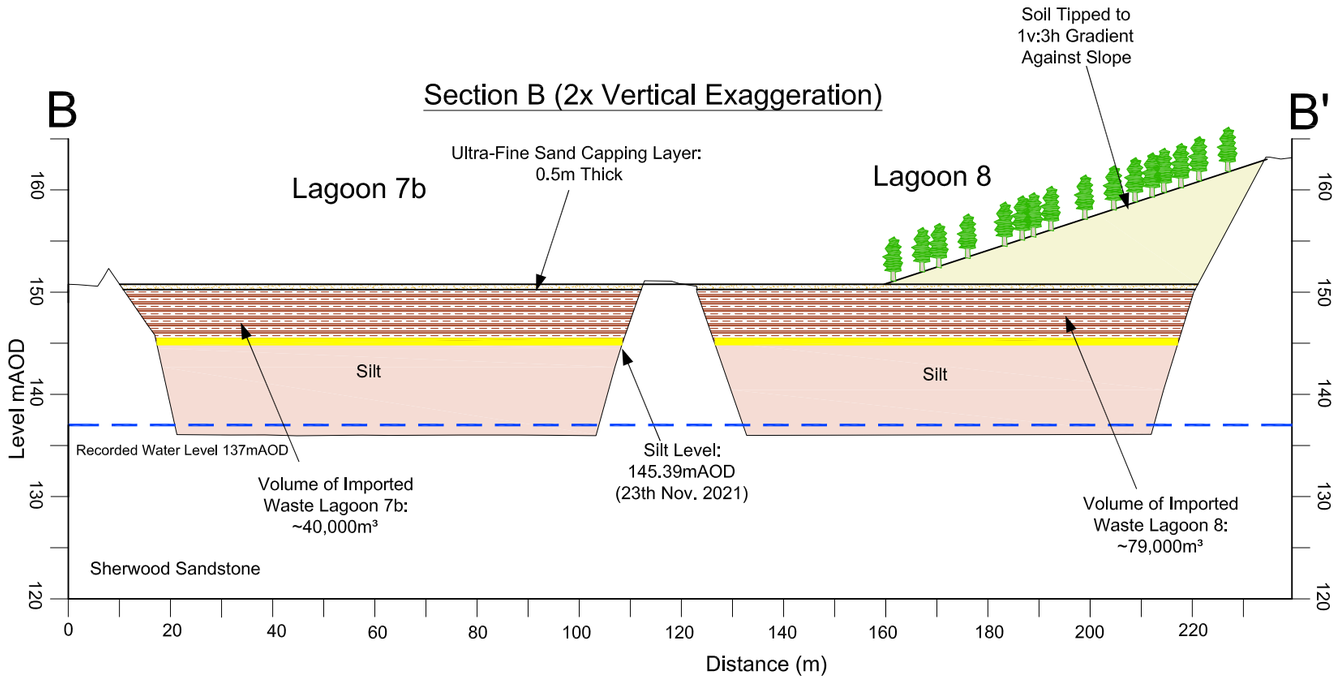
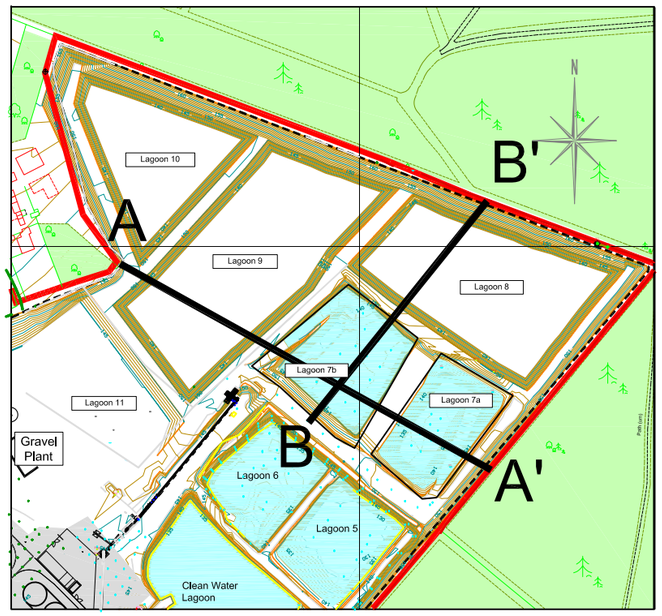
Mansfield Sand

Greenfield enviro







Key

- Ultra-Fine Sand
- Imported Waste
- Silt
- Soil
- Silt Level
- Recorded Water Level

Scale

0m 20m 40m

Site
Two Oaks Quarry

Project
Proposed Restoration

Title
Lagoon 7 & 8 Capping

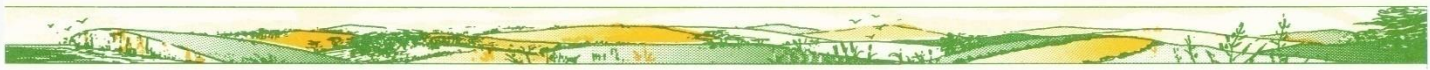
Scale: 1:1250 @ A3
File: TOQ LAgoon 7 and 8 Capping X sec v2.dwg
Drawn by: BGD
Date: 29/11/2022

Mansfield Sand

Greenfield enviro
1 Commercial Road, Keyworth, Nottingham NG12 5JS
Email: admin@greenfieldenviro.co.uk
Tel: 0115 937 2002

Appendix D Site Restoration Plans

ECO TECH
ECOLOGICAL CONSULTANCY



SPECIALISTS IN: HABITAT AND SPECIES SURVEY ECOLOGICAL IMPACT ASSESSMENT MANAGEMENT PLANNING AND ADVICE

Two Oaks Quarry

Restoration scheme for Phase 1 in relation to the discharge of Condition 56 of permission 4/V/2019/0614

August 2023 v2

CONSULTANT: ROBERT MILETO BSc MSc ASSISTANTS SKY MILETO & TIGER MILETO BA
61 COPTHORNE ROAD SHREWSBURY SHROPSHIRE SY3 8NW TEL. (01743) 236096
rm@eco-tech.co.uk

1 Background

In September 2021, Nottinghamshire County Council granted permission for a variation to silica sand extraction and associated site restoration proposals (Ref: 4/V/2019/0614) at Two Oaks Quarry

Condition 56 of the planning permission decision notice states:
"Within the timescales prescribed in Condition 48 above for those phases, part phases, sub-phases or part sub-phases to be restored to heathland, wetland areas and woodland, details of the restoration of those areas shall be submitted to the MPA for its approval in writing. The details shall be in accordance with 'Plan PA3 – Proposed Restoration Scheme & Cross Section' received by the MPA on 28 February 2019 with the aim of creating a mosaic of heathland, acid grassland, short ephemeral vegetation and bare ground with a varied micro-topography, including areas of open water of varying sizes and in clusters, and clumps of scrub and oak-birch woodland. The details shall include the following:
(i) The results of a walk-over survey carried out to identify evidence of, or potential for, protected species along with the results of any further detailed protected species carried out as necessary;
(ii) The results of surveys carried out to identify features that have arisen naturally or as a consequence of excavation works which are of value (or have the potential to be of value) in the context of creating a diverse heathland habitat, and details of how the survey results have been taken into account when drawing up the restoration details;
(iii) Target habitats with reference to the UK Biodiversity Action Plan;
(iv) Woodland, wetland margin and heathland species mixes and establishment methods which should be of native genetic origin and appropriate to the local area, including the source of heather brash and numbers, species, planting, positions and sizes of all trees and shrubs;
(v) Substrate preparation (where required), including the creation of microtopography features;
(vi) Details of the reshaping of the silt lagoons in phase 1 to a shallower edge profile;
(vii) Habitat transition areas between the agricultural grassland areas and the heathland areas;
(viii) Sandstone faces;
(ix) The provision of appropriate refugia areas for reptiles and amphibians using, where appropriate, any rocks, boulders or stones picked in accordance with Conditions 54 and 55 above;
(x) Timetable for the implementation of the restoration works.."

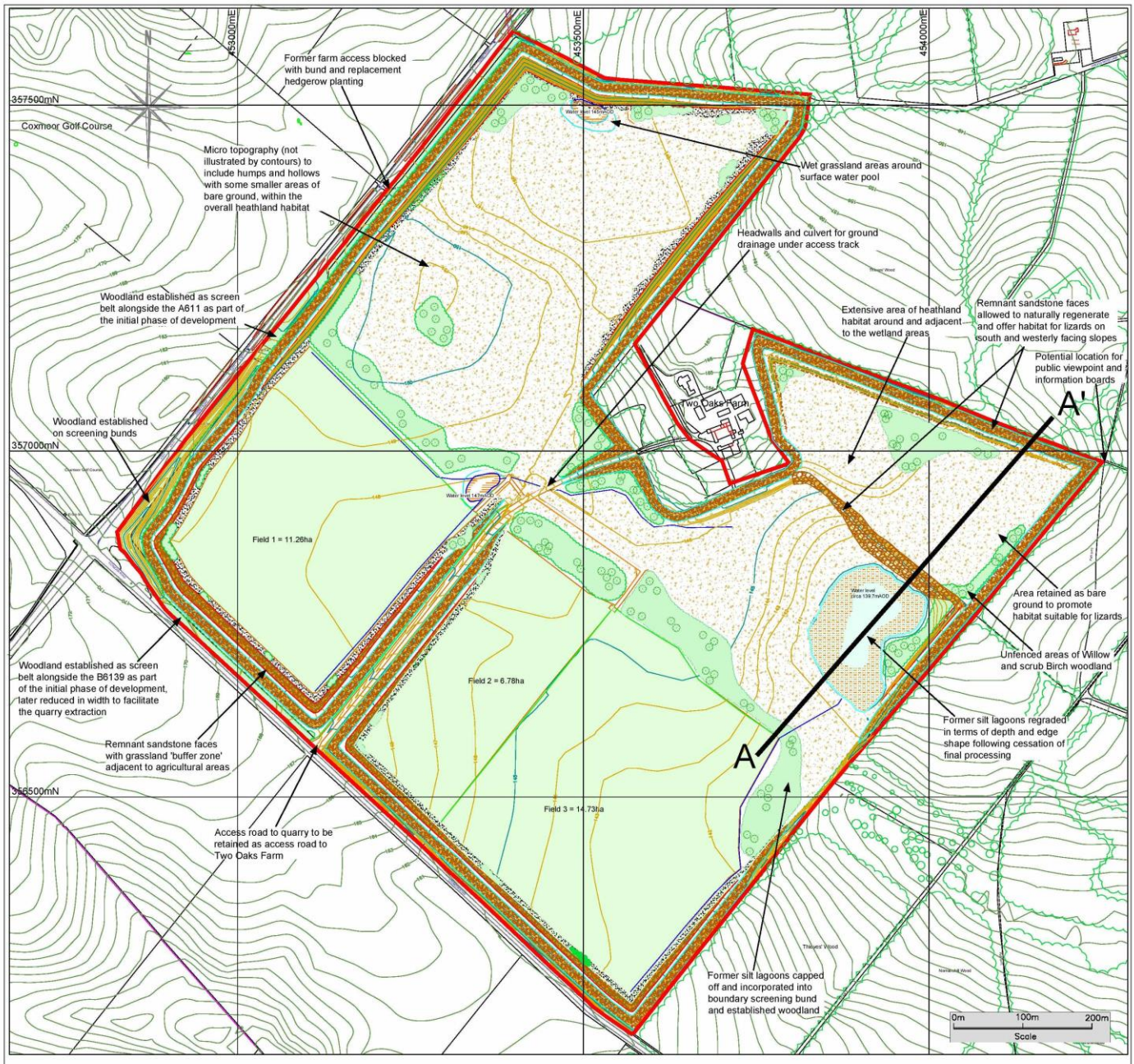
Since the aftercare scheme required by Condition 59 needs to be submitted *"… at the same time as the submission of the restoration details for that phase…*" This report should be considered concurrently with that submitted for the discharge of Condition 59, which provides the required detail on aftercare.

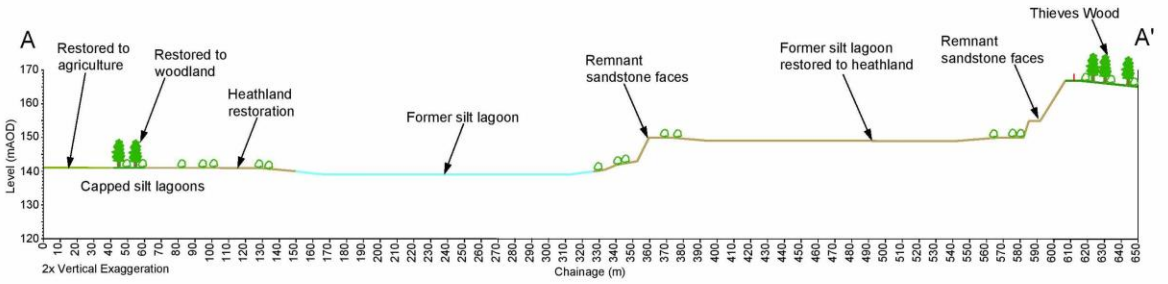
Condition 48 requires this aftercare scheme (and thus this restoration scheme) be submitted *"Within 12 months of the completion of mineral extraction within phase 1a".* Hence, hereon, this report comprises the required restoration scheme for Phase 1 of the permitted operations. **It is important to note,** condition 48 requires this report since mineral extraction in Phase 1a has been completed. However, the restoration of Phase 1 can and only begin when any lagoon is both full, has a 1-2m freeboard from its final level and is sufficiently dry and friable enough to accommodate a dozer and capping medium. Broadly speaking the high level lagoons will take around 4 years to fill by using silt to backfill. This is calculated by surveying the void space in cubic metres and dividing it by the annual tonnage of silt, based on 10% of the total production of raw feed. It will then take a minimum of 1 year after to pump off the standing water and allow the lagoon system to dry out. The following year it can then be capped with material. The timescale can be pro rata'd across the other lagoon systems to give a theoretical time whereby the whole of Phase 1 can be landformed/restored, planted/seeded and enter the aftercare scheme. For this reason, the site is limited to what it can feasibly do in the short term. The reality is it is over a decade away from entering aftercare.

2 The restoration scheme

Map 1 is a copy of Plan PA3 – Proposed Restoration Scheme & Cross Section' to which the detail of this scheme should accord. As per the condition, the aim is to create a mosaic of heathland, acid grassland, short ephemeral vegetation and bare ground with a varied micro-topography, including areas of open water of varying sizes and in clusters, and clumps of scrub and oak-birch woodland

Map 1 Plan PA3 – Proposed Restoration Scheme & Cross Sections. Note that only the top right is within Phase 1, the rest is included for context





Site
Two Oaks Quarry
Kirkby in Ashfield

Project
Conceptual Restoration

Title
Plan PA3 - Proposed Restoration Scheme & Cross Section

Key
- Proposed Restoration Contours
- Proposed Grassland
- Proposed Woodland
- Proposed Wetland Area
- Proposed Shallow Wetland Areas
- Proposed Heathland

Map Scale: 1:6,000 @A3
Section Scale: 1:3,000 @A3
Project No. MSF/TOF/116
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Drawn by: TJS
Date: 25th February 2019

Notes
Site surveyed by Greenfield Associates January 2006
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Mansfield Sand

Greenfield enviro

Photo 1 High definition drone photo of Phase 1 (outlined in red) taken 30th May 2023, showing it comprising primarily bare ground and silt lagoon (open water). Note that the white areas are an artefact of the photo processing software where it finds uniform pixels, Sand martin colonies are indicated by a blue arrow

Element
(i) The results of a walk-over survey carried out to identify evidence of, or potential for, protected species along with the results of any further detailed protected species carried out as necessary;

Results and conclusions
In April and May 2023, the vast majority of Phase 1 was either bare sand or other soil, silt lagoon, small areas of improved grassland, along with tiny areas of other habitat. See Photo 1.

This clearly has no potential for supporting protected species other than:

***Great crested newt* (GCN)**
Water samples taken from the two southernmost lagoons were tested for GEN eDNA. The results were negative and can be seen in Appendix 1.
Therefore, it can be reasonably concluded that this species is not present within Phase 1

Nesting wild birds, especially little ringed plover and sand martin
Survey for evidence of nesting, especially for the two species noted above was undertaken on the 17th April and 31st May 2023.

Results and conclusions
The only signs of active nesting were colonies of sand martin at the locations shown on Photo 1.

The restoration details include vertical and near vertical cliff faces considered highly likely to suitable for sand martin nesting. Offences in relation to active wild bird nests will be avoided by suitable timing of works in all areas found to support active nests (ie: avoiding the breeding season where any works would otherwise damage or destroy an active nest).

Element
(ii) The results of surveys carried out to identify features that have arisen naturally or as a consequence of excavation works which are of value (or have the potential to be of value) in the context of creating a diverse heathland habitat, and details of how the survey results have been taken into account when drawing up the restoration details;

Results and conclusions
In April and May 2023, the vast majority of Phase 1 was either bare sand or other soil, silt lagoon or small areas of improved grassland, along with tiny areas of other habitat. See Photo 1.

None of these are intrinsically considered to be of specific value (or have the potential to be of value) over and above what is proposed for restoration. Consequently, they have not been taken into account when drawing up these restoration details

Element
(iii) Target habitats with reference to the UK Biodiversity Action Plan;

Conclusions
As a result of new drivers and requirements, the 'UK Post-2010 Biodiversity Framework', published in July 2012, has succeeded the UK BAP. In particular, due to devolution and the creation of country-level biodiversity strategies, much of the work previously carried out under the UK BAP is now focussed at a country level. The UK BAP lists of priority species and habitats remain, however, important and valuable reference sources. Notably, they have been used to help draw up statutory lists of priority species and habitats in England (https://jncc.gov.uk/our-work/uk-bap/, accessed April 2023). Therefore, it is these 'priority habitats' (more correctly know as habitats of principal importance – HoPI, see

https://www.gov.uk/government/publications/habitats-and-species-of-principal-importance-in-england, accessed April 2023) that are considered here.

The target HoPI are very much as per the habitats named in the aim of the restoration in sections 1 & 2 above. Table 1 below lists the equivalents.

Table 1: Equivalent HoPIs to the habitats named in the aim of the restoration.

Habitat named in aim	Equivalent HoPI
Heathland	Lowland heathland
Acid grassland	Lowland dry acid grassland
Short ephemeral vegetation and bare ground	Included as minor constituent of lowland heathland
Open water	Mesotrophic or oligotrophic lakes, or ponds
Scrub	Probably included as a minor constituent of lowland heathland
Oak-birch woodland	Lowland mixed deciduous woodland

Element
(iv) Woodland, wetland margin and heathland species mixes and establishment methods which should be of native genetic origin and appropriate to the local area, including the source of heather brash and numbers, species, planting, positions and sizes of all trees and shrubs;

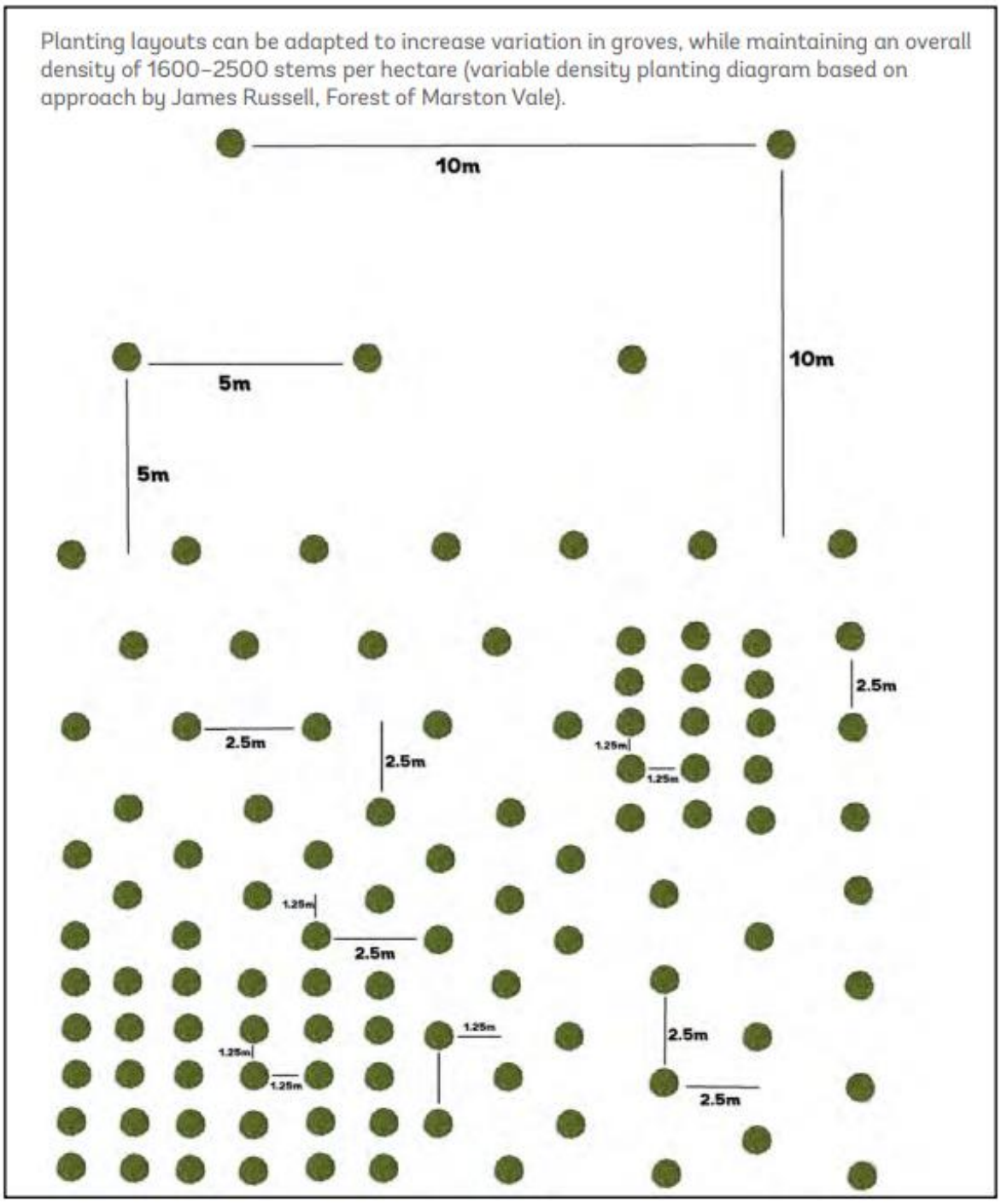
Proposals

Woodland
Where compatible with earthworks required to achieve the final landform, natural regeneration of site-native trees and shrubs will be accepted wherever they are co-incident with the locations shown on Map 1. Elsewhere, planted species will comprise:

pedunculate oak (*Quercus robur*)	40%
silver birch (*Betula pendula*)	35%
holly (*Ilex aquifolium*)	5%
wild cherry (*Prunus avium*)	5%
crab apple (*Malus sylvestris*)	5%
hazel (*Corylus avellana*)	5%
hawthorn (*Crataegus monogyna*)	5%

All of these will be of local provenance (if available). They will be planted as bare root transplants (15 to 90 cm) at the locations shown on Map 1.

Wherever feasible, woodland planting will include groves, open wooded habitats and glades – consequently stem/planting densities will vary. For groves, spacings are generally between one and five metres and/or an overall density of 1600–2500 stems per hectare, as per the figure below. Open wooded habitats and glade areas have lower stem/planting densities;



Wetland margin

Natural regeneration is proposed. This is as per guidance, http://freshwaterhabitats.org.uk/wp-content/uploads/2013/09/Williams-et-al-1997-Design-new-ponds.pdf, accessed April 2023).

Heathland

The proposed heathland will include around 50% acid grassland in a mosaic with the heath/heather. Hence only some 50% of the proposed heathland will require the following treatment. It will be created as follows in association with the Sherwood Forest Trust, Care should be taken to ensure created and other microtopographic features (see element v) are retained – in these areas, hand working may be required;

- Chain harrow or otherwise scarify to create a seed bed
- Apply nurse sward with seed drill. (Mix and application rate as below). Ideally carry out in September

- Roll seeded areas
- Water if required
- Collect local heather brash from October onwards when the majority of heather has gone to seed. Around 1ha worth of material from donor site is needed for the some 4ha of heather dominated heathland planned at the receptor site
- Spread brash onto receiver site using tractor and agricultural spreader
- Roll brash areas to increase contact with ground

Nurse sward seed mix to comprise (available, for example, from https://www.cotswoldseeds.com/seeds/20/grass):
30% Red Fescue (*Festuca rubra*)
50% Sheep's Fescue (*Festuca ovina*)
20% Common Bent (*Agrostis capillaris*)

To be sown at 30kg/ha

Element
(v) Substrate preparation (where required), including the creation of microtopography features;

Proposals
During the creation of the final landform, the area will be formed to have a varied microtopography, with:

- humps and hollows – these will most likely be created by digging around 15, ca. 4m diameter, 2m deep depressions in around 30% of the regraded area and placing the arisings adjacent to form mounds;
- low south-facing banks – these will most likely be created by scraping sand into around 3, 20m long snaking 1m tall banks with a roughly west/east orientation
- areas of bare of sand – the created depressions and the bank faces will not be cultivated or seeded and so remain bare;
- shallow pools/scrapes- at the lowest points in the landform, around 3, irregular edged but ca 10m long 5m wide and 0 to 1m deep pond/scrapes will be dug. The arisings will be formed into adjacent low south-facing banks as above.

Element
(vi) Details of the reshaping of the silt lagoons in phase 1 to a shallower edge profile;

Proposals
To achieve a shallow edge profile, material will be dozed from West to East and South to North at a gradient of around 1v20h which will create a bowl-like structure. The majority of the material will be virgin sand and undulations will be added during the dozing of this material. Additional material will be dozed into the lagoons to create shallow margins around the perimeter of the lagoons.

Element
(vii) Habitat transition areas between the agricultural grassland areas and the heathland areas;

Proposals
This will be an undulating strip of lowland mixed deciduous woodland (Oak-birch woodland) some 20 to 50m wide that divides ant heathland areas in Phase 1 from and adjacent proposed restoration to agriculture (essentially all of its south-west boundary).

Element
(viii) Sandstone faces;

Proposals
See Map 1. These effectively include all orientations and will be some 10 to 20m tall

Element
(ix) The provision of appropriate refugia areas for reptiles and amphibians using, where appropriate, any rocks, boulders or stones picked in accordance with Conditions 54 and 55 above;

Proposals
At least 10 of these will be created, each at least 2m x 2m x 1m and using any rocks, boulders or stones picked in accordance with Conditions 54 and 55, where feasible.

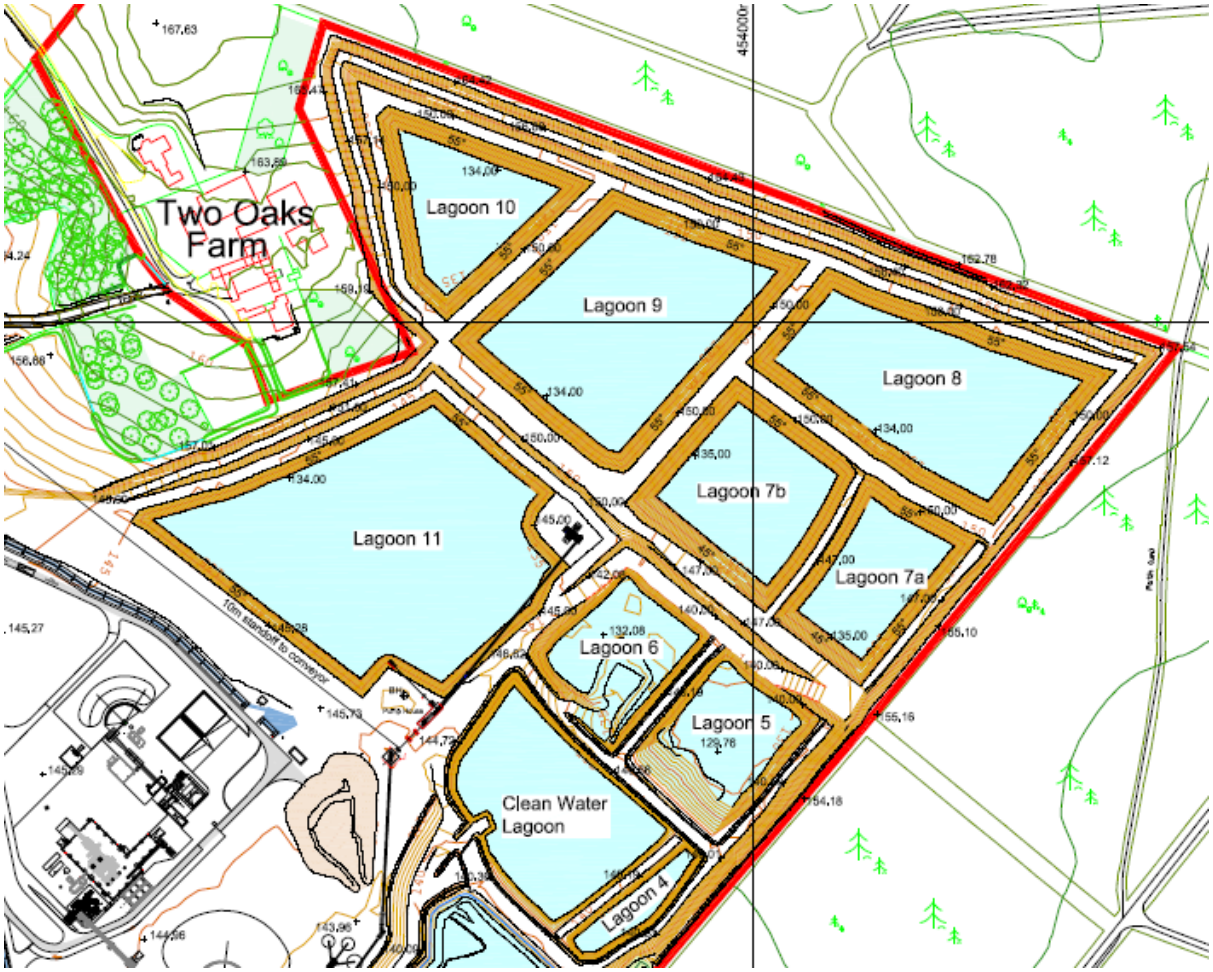
Element
(x) Timetable for the implementation of the restoration works.

Proposals
See Table 1 and Map 2 below

Table 1 Estimated years of completion for elements of works in Phase 1

Element of works in Phase 1	Estimated year of completion
Filling of silt lagoons	Lagoon 8 2026 Lagoon 9 2030 Lagoon 10 2033
Capping of silt lagoons	Lagoon 7a and 7b 2024 Lagoon 8 2027 Lagoon 9 2031 Lagoon 10 2034 Lagoon 11 2023
Creation of final landform for Phase 1	Lagoon 7a and 7b landform 2025/26 Lagoon 8 landform 2028/29 Lagoon 9 landform 2032/33 Lagoon 10 landform 2035/36 Lagoon 11 landform 2035/36 Finished Phase 1 landform 2036
Habitat creation completion	Lagoon 7a and 7b landform 2026/27 Lagoon 8 landform 2029/30 Lagoon 9 landform 2033/34 Lagoon 10 landform 2036/37 Lagoon 11 landform 2036/37 Clean water lagoon and Lagoons 4, 5 & 6 TBC, but in tandem with the decommissioning of the plant.

Map 2 Location of lagoons mentioned in Table 1



Appendix 1 Results of testing water samples for GCN eDNA

SureScreen Scientifics

Folio No: E16459
Report No: 1
Purchase Order: TOI
Client: ECO TECH
Contact: Rob Mileto

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS (TRITURUS CRISTATUS)

SUMMARY

When great crested newts (GCN), *Triturus cristatus*, inhabit a pond, they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm GCN habitation or establish GCN absence.

RESULTS

Date sample received at Laboratory: 17/04/2023
Date Reported: 21/04/2023
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
0644	Two Oaks Large	-	Pass	Pass	Pass	Negative	0
0645	Two Oaks Small	-	Pass	Pass	Pass	Negative	0

If you have any questions regarding results, please contact us: ForensicEcology@surescreen.com

Reported by: Chris Troth **Approved by:** Gabriela Danickova

SureScreen Scientifics

METHODOLOGY

The samples detailed above have been analysed for the presence of GCN eDNA following the protocol stated in DEFRA WC1067 'Analytical and methodological development for improved surveillance of the Great Crested Newt, Appendix 5.' (Biggs et al. 2014). Each of the 6 sub-sample tubes are first centrifuged and pooled together into a single sample which then undergoes DNA extraction. The extracted sample is then analysed using real time PCR (qPCR), which uses species-specific molecular markers to amplify GCN DNA within a sample. These markers are unique to GCN DNA, meaning that there should be no detection of closely related species.

If GCN DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If GCN DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. True positive controls, negative controls and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared and reported. Stages of the DNA analysis are also conducted in different buildings at our premises for added security.

SureScreen Scientifics Ltd is ISO9001 accredited and participate in Natural England's proficiency testing scheme for GCN eDNA testing. We also carry out regular inter-laboratory checks on accuracy of results as part of our quality control procedures.

INTERPRETATION OF RESULTS

SIC: **Sample Integrity Check** [Pass/Fail]
When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results.

DC: **Degradation Check** [Pass/Fail]
Analysis of the spiked DNA marker to see if there has been degradation of the kit or sample between the date it was made to the date of analysis. Degradation of the spiked DNA marker may lead indicate a risk of false negative results.

IC: **Inhibition Check** [Pass/Fail]
The presence of inhibitors within a sample are assessed using a DNA marker. If inhibition is detected, samples are purified and re-analysed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.

Result: **Presence of GCN eDNA** [Positive/Negative/Inconclusive]
Positive: GCN DNA was identified within the sample, indicative of GCN presence within the sampling location at the time the sample was taken or within the recent past at the sampling location.
Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for GCN presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive. 0/12 indicates negative GCN presence.
Negative: GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of GCN absence, however, does not exclude the potential for GCN presence below the limit of detection.

Appendix E Water Quality Data

Parameter	Unit	Limit of Detection	EQS	UKDWS	UKTAG	WM/5 27/03/2023	WM07/1 11/05/2023	WM/2 11/05/2023	WM07/1 01/09/2023	WM/2 01/09/2023	MBHA 07/12/2023	MBHB 07/12/2023	WM07/1 07/12/2023	WM/2 07/12/2023		RAINWORTH 11/05/2023	RAINWORTH 14/11/2023	RAINWORTH 07/12/2023
Dissolved Aluminium	ug/l	<20	-	-	-	10	10	10	10	10	0.75	0.75	0.75	0.75		55	42	39
Dissolved Antimony	ug/l	<2	-	5	-	1	1	1	1	1	1	1	1	1		1	1	1
Dissolved Arsenic	ug/l	<2.5	50	10	5	1.25	1.25	1.25	1.25	1.25	0.45	0.45	0.45	0.45		3.2	1.25	0.45
Dissolved Barium	ug/l	<3	-	-	-	138	68	80	68	67	142.6	116.3	75.5	62		8	4	4.1
Dissolved Cadmium	ug/l	<0.5	0.15	5	-	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	0.015	0.015	**0.26**	0.015		**0.25**	**0.25**	0.015
Dissolved Calcium	mg/l	<0.2	-	-	-	61.9	11.7	35.8	12.6	28.4	59.7	43.1	15.6	25.8		28.4	28.2	20.5
Total Dissolved Chromium	ug/l	<1.5	3.4	50	1	0.75	0.75	0.75	0.75	0.75	0.2	0.2	0.3	0.5		0.75	0.75	0.4
Dissolved Copper	ug/l	<7	1	2000	-	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	0.5	0.5	0.5	0.5		**3.5**	**3.5**	**2**
Total Dissolved Iron	ug/l	<20	1000	-	-	10	10	10	10	10	2.35	2.35	2.35	2.35		537	**1450**	504.9
Dissolved Lead	ug/l	<5	1.2	10	-	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	0.2	0.2	0.2	0.2		**2.5**	**2.5**	0.2
Dissolved Magnesium	mg/l	<0.1	-	-	-	31.8	7	15.5	7.8	12.6	31	20.2	8.9	11.6		8.1	8.8	6.5
Dissolved Manganese	ug/l	<2	123	-	-	1	12	1	21	1	0.75	0.75	13.1	1.5		**458**	**595**	**143.5**
Dissolved Mercury	ug/l	<1	0.07	1	0.02	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	0.005	0.005	0.005	0.005		**0.5**	**0.5**	0.005
Dissolved Molybdenum	ug/l	<2	-	-	-	1	1	1	1	1	0.1	0.7	0.1	0.1		1	1	0.3
Dissolved Nickel	ug/l	<2	4	20	-	1	**5**	1	**5**	1	0.1	0.1	**5**	0.8		1	2	1.3
Dissolved Potassium	mg/l	<0.1	-	-	-						2.5	1.7	2.2	5.4				6.2
Dissolved Selenium	ug/l	<3	-	10	-	1.5	1.5	1.5	1.5	1.5	0.6	0.6	0.6	0.6		1.5	1.5	0.6
Dissolved Sodium	mg/l	<0.1	-	-	-	20.1	20.7	6.9	21.7	5.9	22.8	15.7	28.7	6		11.3	10.6	8.2
Dissolved Zinc	ug/l	<3	10.9	-	-	**19**	3	4	1.5	6	2.9	2.3	3	2.9		**11**	9	5.9
Total Aluminium	ug/l	<20	-	-	-	10	173	273	21	4042	41	280	85	10		117	70	509
Total Antimony	ug/l	<2	-	-	-	1	1	1	1	3	1	1	1	1		1	1	1
Total Arsenic	ug/l	<2.5	50	-	-	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25		3.2	1.25	1.25
Total Barium	ug/l	<3	-	-	-	134	70	84	68	112	122	100	64	52		9	4	6
Total Cadmium	ug/l	<0.5	-	-	-	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25		0.25	0.25	1.3
Total Calcium	mg/l	<0.2	-	-	-	67	12.1	38.4	13.1	32.8	67.7	48.9	18.2	28.9		30	32.8	23.2
Total Chromium	ug/l	<1.5	-	-	-	0.75	0.75	0.75	0.75	5.5	0.75	0.75	0.75	0.75		0.75	0.75	0.75
Total Copper	ug/l	<7	-	-	-	3.5			3.5	3.5	3.5	3.5	3.5	3.5			3.5	3.5
Total Iron	ug/l	<20	-	-	-	10	171	463	10	7960	52	236	68	29		1058	2013	7737
Total Lead	ug/l	<5	-	-	-	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5
Total Magnesium	mg/l	<0.1	-	-	-	33.3	7.5	16.7	8.3	15.2	36.3	24.2	10.6	13.6		8.7	11.1	7.1
Total Manganese	ug/l	<2	123	-	-	1	41	20	18	**400**	1	1	27	1		**402**	**466**	**731**
Total Mercury	ug/l	<1	-	-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5		0.5	0.5	0.5
Total Molybdenum	ug/l	<2	-	-	-	1			1	1	1	1	1	1			1	1
Total Nickel	ug/l	<2	-	-	-	1	5	1	5	7	1	1	3	1		1	2	1
Total Potassium	mg/l	<0.1	-	-	-						2.9	2.9	2.9	6.5				7
Total Selenium	ug/l	<3	-	-	-	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5	1.5
Total Sodium	mg/l	<0.1	-	-	-	22.8	20.6	4.3	22.6	5	25.8	18.7	37.2	8.1		8.5	14.8	7.5
Total Zinc	ug/l	<3	10.9	-	-	**17**	1.5	1.5	1.5	**21**	1.5	1.5	1.5	1.5		10	9	**11**
Total Sulphur as S	ug/l	<10	-	-	-	16296	6777	17853	7313	15424	14.68	17.98	8.5	15.59		7307	5056	5.3
Naphthalene	ug/l	<0.1	2	-	-	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05		0.05	0.05	0.05
Acenaphthylene	ug/l	<0.005	-	-	-	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025		0.0025	0.0025	0.0025
Acenaphthene	ug/l	<0.005	-	-	-	0.0025	0.0025	0.009	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025		0.0025	0.0025	0.0025
Fluorene	ug/l	<0.005	-	-	-	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025		0.0025	0.0025	0.0025
Phenanthrene	ug/l	<0.005	-	-	-	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025		0.0025	0.0025	0.0025
Anthracene	ug/l	<0.005	0.1	-	-	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025		0.0025	0.0025	0.0025
Fluoranthene	ug/l	<0.005	0.0063	-	-	0.0025	**0.01**	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025		0.0025	0.0025	0.0025
Pyrene	ug/l	<0.005	-	-	-	0.0025	0.009	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025		0.0025	0.0025	0.0025
Benzo(a)anthracene	ug/l	<0.005	-	-	-	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025		0.0025	0.0025	0.0025
Chrysene	ug/l	<0.005	-	-	-	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025		0.0025	0.0025	0.0025
Benzo(bk)fluoranthene	ug/l	<0.008	-	-	-	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004		0.004	0.004	0.004
Benzo(a)pyrene	ug/l	<0.005	0.00017	-	-	**0.0025**	**0.0025**	**0.0025**	**0.0025**	**0.0025**	**0.0025**	**0.0025**	**0.0025**	**0.0025**		**0.0025**	**0.0025**	**0.0025**
Indeno(123cd)pyrene	ug/l	<0.005	-	-	-	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025		0.0025	0.0025	0.0025
Dibenzo(ah)anthracene	ug/l	<0.005	-	-	-	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025		0.0025	0.0025	0.0025
Benzo(ghi)perylene	ug/l	<0.005	0.0002	-	-	**0.0025**	**0.0025**	**0.0025**	**0.0025**	**0.0025**	**0.0025**	**0.0025**	**0.0025**	**0.0025**		**0.0025**	**0.0025**	**0.0025**
PAH 16 Total	ug/l	<0.173	-	-	-	0.0865	0.0865	0.0865	0.0865	0.0865	0.0865	0.0865	0.0865	0.0865		0.0865	0.0865	0.0865
Benzo(b)fluoranthene	ug/l	<0.008	0.0002	-	-	**0.004**	**0.004**	**0.004**	**0.004**	**0.004**	**0.004**	**0.004**	**0.004**	**0.004**		**0.004**	**0.004**	**0.004**
Benzo(k)fluoranthene	ug/l	<0.008	-	-	-	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004		0.004	0.004	0.004
PAH Surrogate % Recovery	%	<0	-	-	-	74	85	94	79	76	78	93	83	81		82	74	89

Parameter	Unit	Limit of Detection	EQS	UKDWS	UKTAG	WM/5 27/03/2023	WM07/1 11/05/2023	WM/2 11/05/2023	WM07/1 01/09/2023	WM/2 01/09/2023	MBHA 07/12/2023	MBHB 07/12/2023	WM07/1 07/12/2023	WM/2 07/12/2023		RAINWORTH 11/05/2023	RAINWORTH 14/11/2023	RAINWORTH 07/12/2023
Resorcinol	mg/l	<0.01	-	-	-		0.005	0.005			0.25	0.25	0.25	0.25		0.005	0.005	0.25
Catechol	mg/l	<0.01	-	-	-		0.005	0.005			0.25	0.25	0.25	0.25		0.005	0.005	0.25
Phenol	mg/l	<0.01	0.0077	-	-	0.25	0.005	0.005	0.25	0.25	0.25	0.25	0.25	0.25		0.005	0.005	0.25
m/p-cresol	mg/l	<0.02	-	-	-		0.01	0.01			0.25	0.25	0.25	0.25		0.01	0.01	0.25
o-cresol	mg/l	<0.01	-	-	-		0.005	0.005			0.25	0.25	0.25	0.25		0.005	0.005	0.25
Total cresols	mg/l	<0.03	-	-	-		0.015	0.015			0.25	0.25	0.25	0.25		0.015	0.015	0.25
Xylenols	mg/l	<0.06	-	-	-		0.03	0.03			0.25	0.25	0.25	0.25		0.03	0.03	0.25
1-naphthol	mg/l	<0.01	-	-	-		0.005	0.005			0.25	0.25	0.25	0.25		0.005	0.005	0.25
2,3,5-trimethyl phenol	mg/l	<0.01	-	-	-		0.005	0.005			0.25	0.25	0.25	0.25		0.005	0.005	0.25
2-isopropylphenol	mg/l	<0.01	-	-	-		0.005	0.005			0.25	0.25	0.25	0.25		0.005	0.005	0.25
Total Speciated Phenols HPLC	mg/l	<0.1	-	-	-		0.05	0.05			2.5	2.5	2.5	2.5		0.05	0.05	2.5
2-Chlorophenol	ug/l	<0.5	-	-	-						0.25	0.25	0.25	0.25			0.25	0.25
2-Methylphenol	ug/l	<0.5	-	-	-						0.25	0.25	0.25	0.25			0.25	0.25
2-Nitrophenol	ug/l	<0.5	-	-	-						0.25	0.25	0.25	0.25			0.25	0.25
2,4-Dichlorophenol	ug/l	<0.5	-	-	-						0.25	0.25	0.25	0.25			0.25	0.25
2,4-Dimethylphenol	ug/l	<0.5	-	-	-						0.25	0.25	0.25	0.25			0.25	0.25
2,4,5-Trichlorophenol	ug/l	<0.5	-	-	-						0.25	0.25	0.25	0.25			0.25	0.25
2,4,6-Trichlorophenol	ug/l	<0.5	-	-	-						0.25	0.25	0.25	0.25			0.25	0.25
4-Chloro-3-methylphenol	ug/l	<0.5	-	-	-						0.25	0.25	0.25	0.25			0.25	0.25
4-Methylphenol	ug/l	<0.5	-	-	-						0.25	0.25	0.25	0.25			0.25	0.25
4-Nitrophenol	ug/l	<0.5	-	-	-						0.25	0.25	0.25	0.25			0.25	0.25
Pentachlorophenol	ug/l	<0.5	-	-	-						0.25	0.25	0.25	0.25			0.25	0.25
Phenol	ug/l	<0.5	-	-	-						0.25	0.25	0.25	0.25			0.005	0.25
Total Speciated Phenols MS	ug/l	<6	-	-	-						3	3	3	3			3	3
Fluoride	mg/l	<0.3	5	1.5	-	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15		0.15	0.15	0.15
Sulphate as SO4	mg/l	<0.5	400	-	-						44	53.3	22.8	45.4				16.9
Chloride	mg/l	<0.3	250	-	-	55.3	36.7	24.8	37.2	18.1	56.2	45.6	47.8	13.5		26.6	15.8	21.2
Nitrate as N	mg/l	<0.05	-	-	-	14.93	5.75	12.27	2.35	9.45	16.94	10.14	2.23	7.49		0.45	0.19	0.46
Nitrite as N	mg/l	<0.006	-	-	-	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003		0.003	0.003	0.003
Ortho Phosphate as P	mg/l	<0.03	-	-	-	0.015	0.23	0.35	0.23	0.38	0.015	0.015	0.19	0.41		0.13	0.19	0.08
Ammoniacal Nitrogen as NH3	mg/l	<0.030	0.2	-	-	0.015	0.015	0.015	0.038	0.015	0.015	0.015	0.015	0.015		0.066	0.094	0.151
Total Alkalinity as CaCO3	mg/l	<1	-	-	-	152	28	44	38	48	164	86	50	48		76	100	68
Carbonate Alkalinity as CaCO3	mg/l	<1									0.5	0.5	0.5	0.5				0.5
Bicarbonate Alkalinity as CaCO3 (water soluble)	mg/l	<1									164	86	50	48				68
Dissolved Oxygen	mg/l	<1	-	-	-	9	10	10	10	10	10	9	10	10		8	7	11
Electrical Conductivity @25C	uS/cm	<2	-	-	-	672	250	399	278	352	669	478	314	294		286	302	212
pH	pH units	<0.01	-	-	-	8.06	7.13	6.68	7.1	6.64	7.95	7.26	6.68	6.66		7.17	7.08	6.89
Hardness	mg/l $CaCO_3$		-	-	-	304	61	165	67	144	319	222	89	128		111	128	87

* Results below Limit of Detection (LOD) are shown as half the LOD.

Red	Shows exceedances of EQS values
Orange	Shows exceedances of UKDWS
Green	Shows exceedances of UKTAG Quantification limit